A Database Publication

THE MICRO USER

Volume 6
Number 9
November 1988
£1.50

Top-selling guide to the BBC Micro, Master, Archimedes and Z88

You have now solved Rubik's Clock!
>_
RUBIK'S CLOCK
SOLVED
SOLVED
SOLVED
SOLVED
SOLVED
SOLVED
SOLVED
SOLVED
SOLVED
RGB vision-I
KAGA

MAP

Explore the depths of the Palace of Magic

PUZZLES

Here's a simple way to solve word squares

INTELLIGENCE

Build your own expert system

ARCHIMEDES

Do-it-yourself colour selector

TYPE-IN GAMES

- Great fun with our space adventure
- A superb strategy test for Z88 or BBC

REVIEWS

- BBC Handbook
- System Delta
- Chromalock
- Water Manager

...plus all the latest games

Solving Rubik's Clock is child's play: Full listing

PLAY IT AGAIN SAM 3

SUPERIOR APPROVED

COMMANDO
The Smash No. 1 Hit from Elite

Super Joe – Crack Combat Soldier – fights a lone battle against overwhelming odds. All the action and tension of the World's Number One Arcade Game.

"Non-stop Commando action". . . . The Micro User

A Superior Hit

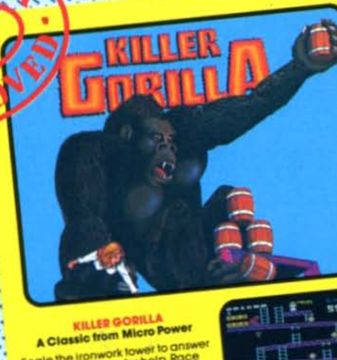
PALACE of MAGIC

PALACE OF MAGIC
A Superior Software Chart Topper

Over 100 screens of challenging puzzles and awesome foes. Even better than Citadel.

"This is excellent . . . I can't wait to get back to solving it!" . . A & B Computing

SUPERIOR APPROVED



KILLER GORILLA
A Classic from Micro Power

Scale the ironwork tower to answer the maiden's cries for help. Race along the girders, career along conveyers and jump on to moving elevators.

"Killer gorilla is an excellent version of the arcade game." . . . A & B Computing.
"A classic game." . . . Acorn User.

A Superior Hit

KILLER GORILLA 2

KILLER GORILLA 2
Superior's Authentic Sequel

Climb the vines, chains and laser beams, avoiding the electric spikes and vicious aardvark birds. When first released, it was awarded a maximum ★★★★★ by Home Computer Weekly.

"You'll need a lot of skill . . . the interest level remains high." . . . Popular Computing Weekly

A CHART-TOPPING COMPILATION for the BBC Micro and Acorn Electron

Superior Software has carefully selected two of the greatest games from other software houses and combined them with two of its own top hits. The result is a top quality four-game compilation that combines variety with great value for money.

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	BBC Master Compact 3½" Disc	£14.95

(Compatible with the BBC B, B+ and Master Series computers)

Please make cheques payable to "Superior Software Ltd".

PRIZE COMPETITION

£100 is the first prize in our PLAY IT AGAIN SAM 3 competition, with prizes of computer games for 20 runners-up.
To enter the competition, you must answer one question about each of the four games in the compilation. To answer the questions you will need to have reached an advanced stage in each of the games.

Closing date: 28th February, 1989.

SUPERIOR SOFTWARE Limited

ACORNSOFT

The screen pictures show the BBC Micro versions of the games.

Access VISA

24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE
- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

(This does not affect your statutory rights)

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept 3PS7, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: (0532) 459453.

5% Discount On ALL Archimedes From BEEBUG

The Archimedes Specialists

In Addition To. . .

1 0% FINANCE

For a limited period we are able to offer 0% APR finance over 9 months on the purchase of any Archimedes. You pay no interest at all. This is a **brand new** scheme only available from BEEBUG. The deposit and repayments are shown below.

	Deposit	9 Payments		Deposit	9 Payments
A305			A310		
A305 Base	£79.66	£76.00	A310 Base	£93.24	£91.00
A305 Mono	£91.21	£82.00	A310 Mono	£104.79	£97.00
A305 Colour	£104.01	£100.00	A310 Colour	£117.59	£115.00
A310M			A440		
A310M Base	£104.79	£97.00	A440 Base	£278.93	£276.00
A310M Mono	£107.34	£104.00	A440 Mono	£290.48	£282.00
A310M Colour	£129.14	£121.00	A440 Co'our	£303.28	£300.00

2 TRADE IN YOUR OLD BBC, MASTER OR COMPACT FOR AN ARCHIMEDES

We will be pleased to accept your old computer (in working condition) as part exchange towards the purchase of an Archimedes. (If you use the finance scheme this will replace your initial deposit on a 305/310, so you pay nothing now). Allowances are as follows:

BBC Issue 4 No DFS	£125	BBC Issue 4 DFS	£175
BBC Issue 7 No DFS	£175	BBC Issue 7 DFS (Or B+)	£225
Master 128	£250	Compact Base System	£215

Please phone for allowances on other Compact and Master systems.

3 EXPORT

Although unable to offer finance to overseas customers, we can offer an efficient export service with delivery to your door. Please write for a quotation.

4 FREE PC EMULATOR AND 1st WORD PLUS

Purchase your Archimedes by Cheque, Access, Visa, Official Order or 11.5% finance and we will supply you, absolutely free, 10 3.5" discs, a lockable disc storage box, printer lead and the latest version of The PC Emulator from Acorn. Additionally if you are purchasing a 440 system you will receive 1st Word Plus.

Prices Including VAT		
A305 Base £763.66	Mono £829.21	Colour £1004.01
A310 Base £912.24	Mono £977.79	Colour £1152.59
A440 Base £2762.93	Mono £2828.48	Colour £3003.28

5 11.5% FINANCE OVER 12 TO 36 MONTHS

As a Licensed Credit Broker we are able to offer finance on the purchase of any equipment, including the Archimedes. You still benefit from the free PC Emulator, discs, disc box and printer lead. (Typical APR 23% on the purchase of a 310 Colour system over 36 months.
Deposit £152.59 36 payments of £37.36).

6 DISCOUNTS FOR EDUCATION

We are able to offer attractive discounts to Education Authorities, Schools, Colleges and Health Authorities. Please write with your requirements for a quotation.

These discounts are available to you as a member of RISC User, THE leading magazine dedicated solely to Archimedes. So if you are not yet a member, join now for only £14.50 for a full year.

TO FIND OUT MORE PHONE OR WRITE NOW. TEL: 0727 40303

We offer a complete service, including Advice, Technical Support, Showroom, Mail Order and Repairs. Our showroom in St. Albans stocks everything available for the Archimedes. Call in for a demonstration.

MU11

Please indicate your requirements below.
Subscription to Risc User (£14.50 UK) ☐ Information Pack and Catalogue ☐ 0% Finance Form for 305/310/310M/440 Base/Mono/Colour ☐ 12-36 Months Finance Form for 305/310/310M/440 Base/Mono/Colour ☐ Trade In BBC/Master/Compact ☐ Purchase 305/310/440 Base/Mono/Colour ☐
UK Courier Delivery £7.00. Overseas please ask for a quotation.

I enclose a cheque value £..............................
Please debit my Access/Visa/Connect Card No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Expiry....../...... with £.............

Name ....

Address ....

....

Signature ....

Beebug, Dolphin Place, Holywell Hill, St. Albans, Herts AL1 1EX Tel: 0727 40303
BEEBUG – The Archimedes Specialists

THE MICRO USER

Managing Editor
Derek Meakin

Group Editor
Alan McLachlan

Features Editor
Peter Davidson

Production Editor
Peter Glover

Assistant Features Editor
Steve Turnbull

News Editor
Mike Cowley

Technical Editor
Mike Cook

Promotions Editor
Christopher Payne

Promotions Coordinator
Robin Nixon

Reviews Coordinator
Pam Turnbull

Advertisement Manager
John Snowden

Advertising Sales
Peter Babbage, Gail Blincow

Tel: 0625 878888 (All depts.)
0625 879940 (Subs.)
Telecom Gold: 72:MAG001
Telex: 9312188888 DB
Prestel Mailbox: 614568383
Fax: 0625 879966

Published by:
Database Publications Ltd,
Europa House, Adlington Park,
Adlington, Macclesfield SK10 4NP.

Subscription rates for
12 issues, post free:

£18 – UK
£28 – Europe (incl. Eire)
£34 – Overseas Surface
£45 – Overseas Air

ABC 59,727
Jan-June 1986
ISSN 0265-4040

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1988 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

News trade distribution: Diamond Europress Sales & Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

Database Publications is a division of Europress Ltd

Features

7 News
All the latest events in the ever-changing world of your BBC Micro.

19 Problem Solved
A helping hand with some of those mind-testing hardware problems.

22 Library
More high-quality routines which you can use in your own programs.

61 Ceefax Guide
What's coming this month on the telesoftware pages of BBC TV.

62 Rubik's Clock ✱
Discover the secret of this mind-boggling puzzle and amaze friends.

66 Body Building
Our hardware guru shows some more experiment board techniques.

75 Expert Systems ✱
Now your BBC Micro can enter the world of Artificial Intelligence.

81 Leaky Listing
We give the solution to last month's bug-ridden brain-teaser.

86 Hac Man ✱
A wealth of useful hints and news from our resident games expert.

90 Key to Success
We interview a BBC Micro games writer. Will he make it to the top?

108 Mad Hatter
Our monthly look at adventure games – old, new and revamped.

112 Palace of Magic
Find out where you're going using this full map of the great game.

127 Letters
The chance to get your news, views, moans and name into print.

Game

117 Space Escape ✱
Collect all the blueprints in this brain-taxing arcade adventure.

Utilities

26 Logo Pix ✱
A handy routine to enhance your FontStyle letters with a logo.

45 Colour Set ✱
Make the right selection out of the 4,096 colours of the Archimedes.

82 Word Puzzles ✱
Baffled by word squares? This program will unravel the problem.

35 Bridg-It
Try our fascinating game of strategy for either your Z88 or BBC Micro.

39 Z88 Letters
Having trouble with your Z88 micro? We solve some of your technical queries.

41 Spell-Master
Now typos and spelling errors on your micro can be a thing of the past.

89 **Mousing About** ✱
We invite you to experiment with your Archimedes input device.

Reviews

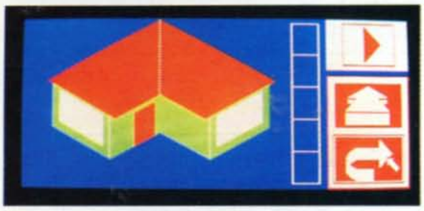
31 **Software Scene**
Our reviewers cast their eyes over the very latest games releases.

51 **Food for Thought**
Is a new book on the BBC Micro needed? We take a thorough look.

53 **Minerva Business**
Some new Archimedes packages come under the microscope

73 **Chromalock**
A new interface to combine video signals with the micro's output.

Education



46 **Education Reviews**
Looking at the best in software for the BBC Micro series in schools.

Cover story

Solve the mind-bending Rubik's Clock easily with the listing on Page 65.

And we reveal the secrets behind the solution so you can amaze your friends by unravelling the puzzle that even the inventor claims he hasn't solved.

PROFILE OF A GAMES CREATOR

We talk to Gordon Key, author of some of the best games that have appeared in *The Micro User*. On Page 90 he recalls previous programs. He also describes his latest game – Clogger – which will be launched at the November Electron & BBC Micro User Show and exclusively previewed on a FREE disc that will be included with your December issue of *The Micro User*.

A new speedy service for readers buying *The Micro User* special offers . . . starts this month.

All orders of £100 or more will be delivered by overnight courier and at no extra cost!

Among our special offers this month are a FREE magazine subscription when you subscribe to the monthly tape and disc (see Page 91), a substantially reduced MicroLink dual speed modem (see Page 20) and a new compilation of Ten of the Best educational games (see Page 114).

For details on how to order, turn to the form on Page 135.

MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to **Page 71** to find just what you're looking for – from cheap modems to complete computer systems.

✓ **For full details on how the checksums work, see the Get-it-Right article on Page 28 of the February 1988 issue of *The Micro User*.**

✱ **The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.**

NEXT MONTH

THE BIG UNWRAP
Xmas fun for BBC or Z88

INKS
Colour printing for all

UTILITY
Create your own tickets

PLUS FREE DISC
Packed with software

THE MICRO USER
December issue on sale November 2

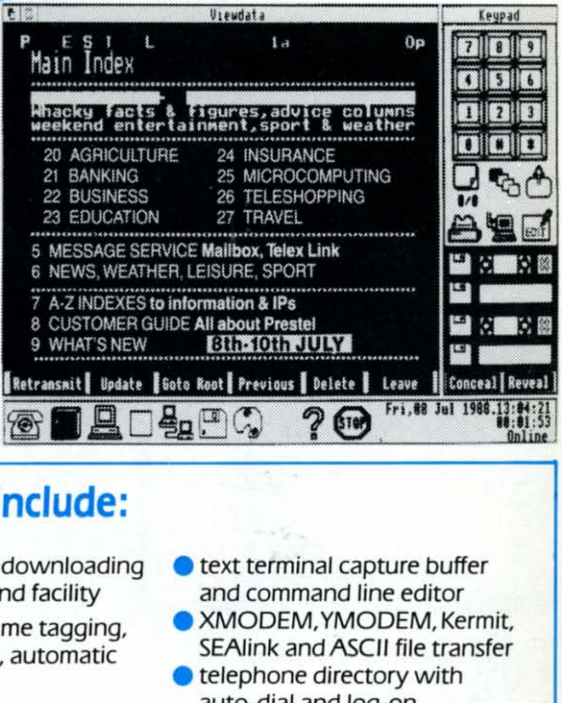
"Quite simply, Hearsay is visually stunning and extremely effective."
"Beebug has done an excellent job. . ."
". . . Hearsay can be wholeheartedly recommended."
MICRONET Aug 1988

BEEBUG HEARSAY

FOR THE ARCHIMEDES

State of the Art Communications Software

Hearsay is an exciting new package taking communications on the Archimedes into a new league. Written specifically for the Archimedes, Hearsay makes full use of the WIMP environment making it very easy to use. It is ideal for use with Prestel, Telecom Gold and bulletin boards, and no technical knowledge is necessary. However, experienced users will find Hearsay packed with advanced features making it an indispensible tool.



```
P  E S I  L            1a           0p
Main Index
.............................................
Whacky facts & figures,advice columns
weekend entertainment,sport & weather
.............................................
 20 AGRICULTURE      24 INSURANCE
 21 BANKING          25 MICROCOMPUTING
 22 BUSINESS         26 TELESHOPPING
 23 EDUCATION        27 TRAVEL
.............................................
5 MESSAGE SERVICE Mailbox, Telex Link
6 NEWS, WEATHER, LEISURE, SPORT
.............................................
7 A-Z INDEXES to information & IPs
8 CUSTOMER GUIDE All about Prestel
9 WHAT'S NEW          8th-10th JULY
.............................................
Fri,08 Jul 1988.13:04:21
00:01:53
Online
```

Terminals supported:

- VT220, VT100, VT52
- ANSI (IBM)
- Viewdata (Prestel)
- Tektronix
- TTNS (Times Network)
- Teletype

Features include:

- telesoftware downloading and frame send facility
- Viewdata frame tagging, screen dump, automatic MBX reply
- comprehensive Viewdata editor with pixel editor
- text terminal capture buffer and command line editor
- XMODEM, YMODEM, Kermit, SEAlink and ASCII file transfer
- telephone directory with auto-dial and log-on
- optional call logging facility

Please send me ____ copy/copies of Hearsay at £69 plus £2 carriage. I enclose a cheque for £______
All cheques must be in pounds sterling drawn on a UK bank.
Please debit my Access/Visa/Connect account with £______
Card Number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Expiry date _____/_____ Signature________________
Access/Visa/Connect card holders may alternatively call our 24 hour hotline on (0727) 40303.

Official orders welcome
Name________________
Address________________
____
Postcode________________

Post to:
BEEBUG Ltd. Dolphin Place
Holywell Hill, St. Albans
Herts AL1 1EX
MU11

Hearsay supports all popular modems including Hayes, Tandata TM512 (DTI), Magic, Apollo, Voyager and most intelligent modems.
Supplied on disc with 200 page user guide.
Price £69

Winchester install utility supplied.

Beebug Ltd. Dolphin Place, Holywell Hill,
St. Albans, Herts., AL1 1EX
Tel. (0727) 40303

NEWS beat

Multi-tasking comes with new Risc OS

RUMOURS have finally become reality: Enhancements to the Archimedes' operating system mean that the machines now offer collaborative high speed multi-tasking – the ability to run effectively more than one program at a time.

The new Risc operating system allows multi-tasking programs to be run simultaneously within windows, and information, pictures and text can be transferred between applications instantaneously by dragging icons.

The Risc operating system offers significant advances and new opportunities both for end users and software developers", claims David Bell, Acorn's microsystems products manager.

"The speed and processing power of the Acorn 32 bit Risc technology makes it possible to deliver a powerful multi-tasking environment in an affordable desktop computer".

Acorn's managing director Harvey Coleman (left) with corporate communications manager Michael Page unveiling Risc OS for the Archimedes at the recent PC Show

Three multi-tasking applications, worth around £100, are being bundled with the operating system. These can be used to create text, line diagrams and high quality illustrations – which can then be printed directly or incorporated into another application – without having to stop other programs.

The machines have also been made easier to use, with the windowing system now having a more intuitive "feel". Other features include a calculator, alarm clock and an electronic mail system for network users that allows messages to be sent or received while programs are running.

A particular time saver is a magnify utility which allows users to take a close look at part of a screen without needing to pause to zoom a cific aspects of BBC B and Master micros.

Programs written for the existing operating system – which will remain available – are provided for by Risc OS. A modified loader file caters for the small proportion of applications which require it.

Risc OS occupies four rom chips while the applications and utilities take up two discs. Extensive documentation is included.

The package will be available from April 1989, when existing users will be able to upgrade for around £50, with a special price to educational users of £29 for an introductory period.

Acorn's marketing director Ian Laurence sees the package as one of the most important additions yet to the range of Archimedes software.

"People who use Archimedes systems for running businesses, controlling engineering processes, designing, making music and many other applications will be able to generate all their printed material requirments on the same machine", he said.

Shades fever strikes

Shades, the most famous of all the interactive on-line computer games, is enjoying an unprecedented boom in popularity.

The latest army of fans to enter the mystical world are drawn from the ranks of Micro-Link subscribers.

Within days of what has been described as "the ultimate adventure multi-user game" being introduced onto the system, record log-on times were being recorded.

"Our subscribers appear to be suffering from Shades fever", says Derek Meakin. "In fact, we find a substantial number of businessmen on MicroLink are even giving up their lunch times to play".

Arcing back into the black

ACORN computers is operating in the black again for the first time since its £3.2 million loss last year.

Following 12 straight months of losses the company reported a profit of £1.05 million for the first six months of this year. Net income for the year totals £710,000.

Two factors have contributed to the turnaround, said Acorn chairman Elserino Piol: "Higher margins were achieved by concentrating on mainstream products, notably the Archimedes range.

"The company also had the benefit of a lower cost base following withdrawal from the custom systems market last November".

Sales for the six months were £20.5 million, up from £17.1 million for the preceding six months.

The company still owes the banks £1.8 million – but this is the lowest level of debt for three years. At the end of 1987 the figure was £4.7 million.

Managing director Harvey Coleman said the Archimedes was penetrating existing markets as well as generating opportunities in new markets.

"In education it is now broadly recognised that the ideal computer platform on which to develop the cross-curricular materials of the 1990s needs to have the affordable power which the Archimedes machines offer", said Coleman.

"The Master series continues to sell in good numbers because the merits of its comprehensive specifications are widely recognised and the machines are also seen as putting their users on the path to the future".

Acorn says its new products – especially those using the Unix operating system due to be launched early next year – will open up further opportunities.

"The successes we have enjoyed, encouraging as they are, are merely the first steps toward our target of a consistently profitable future", said Elserino Piol.

CJE micro's

THE ACORN SPECIALISTS

The widest range of Archimedes Hardware & Software anywhere!

ARCHIMEDES

External Drive Interface

Fully buffered with link options. THE BEST. £30.00. N.B. not all drives are Archimedes compatible

Drive Swap Switch

For above makes external drive '0', internal drive '1'. Ideal for PC Emulator as 5.25" drive becomes A:Internal B: £8.00.

Drive Select Translation Cable

When used with above, interface links in external drive can stay set to '0', saves hassle when moving a drive from a Beeb. £9.00.

DFS Utils

A quick and easy to use program that will transfer all or selected files from DFS to ADFS and ADFS to DFS.
DFS Formatter included £20.00
DFS Reader only £13.00

Monitor Switch Box

Archie/BBC. Plug both a BBC and an *Archimedes* into an *Acorn Archimedes* colour monitor. £10.00.

Archimedes <-> BBC RS423 link kit including file transfer software. £15.00.

PRICES INCLUDE VAT

P&P £1 or as quoted
TRADE & EXPORT ORDERS WELCOME
please enquire for delivery cost.
Phone/Credit Card and Official Orders welcome.

C.J.E. MICRO'S (Dept. MU), 78 Brighton Road, Worthing, W. Sussex BN11 2 EN
(0903) 213361 (3 lines)

FONTAID

'FONTAID' NLQ Font designer for CANON/TAXAN & STAR NL10/LC10
(Archie version available).
Ring for a leaflet

SOFTWARE

'Multi Font NLQ' for most printers
(SWR workspace version now available)
'INFORM' Sideways Ram information system!
Ring for a leaflet

PRINTERS & MONITORS

PRINTERS
Star/Canon/Panasonic/Juki
MONITORS
Philips/Microvitec
Ring for best prices

Archimedes
Acorn
The choice of experience.

Special offers on ARCHIMEDES & MASTERS. Ring for details.
Officially approved ACORN/ ARCHIMEDES Dealer & Service Centre.
Come to our shop for a demonstration.

NEWS beat

Arc in control

WHAT is claimed to be the first expansion card to exploit the potential of the Archimedes' 16 bit wide expansion backplane data bus has been released by Intelligent Interfaces (0789 415875).

The 16 bit Parallel Expansion Card makes the most of the Archimedes' capacity for high-speed digital input and output and offers engineers and scientists greater flexibility from the micro.

Software supplied on disc extends the operating system and presents a simple low level interface for assembler programmers, and more than one card can be fitted – two in a 300 series or up to four in a 400 series Archimedes.

The card is particularly suitable for control applications.

Archimedes DTP package makes show debut

ACORN'S presence at this year's PC Show was dominated by products for the Archimedes – notably the company's own desktop publishing package and enhanced Risc operating system, neither of which will be available until next year.

On this occasion there were also many third party suppliers sharing the limelight on what – at 250 sq metres – was Acorn's largest ever stand.

They displayed a wide range of new hardware and software for the machine, including business, Cad and music packages.

Visitors to Earls Court had to go elsewhere to find products for their BBC Micros and Masters, but – although a fair number of attractive packages were on offer – they were not overwhelmed.

In fact the Z88 – with a collection of interesting new software – was better served for new products than the BBC Micro and Master.

A full report on what the PC Show had to offer owners of Acorn machines will be carried in next month's issue of The Micro User.

New BBS system

A SOPHISTICATED bulletin board software package that works on BBC B, Master and Compact micros is the latest offering from Orion Computer Services.

EBBS will work with most popular modems and the software allows a user without any programming knowledge to set up a system.

The software will allow callers to ring and leave messages, download programs, look at text files and use online routines.

Version II of the software supports ringback, use of star commands and access time facilities. Also included is a new suite of editors for the sysop's offline use, extended chatting facilities and online editing of user flags and privileges.

The system allows callers using viewdata and scrolling Ascii terminals in both 40 and 80 columns.

Prices from £35.

Bigger backplanes

BACKPLANES are essential additions to an Archimedes 310 or 305 for users wishing to add expansion cards – and expansions are essential for users wishing to add a considerable range of hardware to their micros.

Now IFEL (07555 7286) has come to the rescue with the release of a four-slot model, double the number supplied on a standard backplane. Four expansion cards is the maximum allowed by the Archimedes hardware – and pushes the expansion potential of the 305 and 310 machines near that of the 400 series.

A cooling fan and all fixtures are provided and no soldering is involved. Price £59.95.

An upgrade scheme is available to existing users with a standard Acorn two-way backplane.

Egyptian order

TAKING the art of pyramid selling to new heights, Acorn has secured a substantial order with the Egyptian Government's education department.

As the first stage in a pilot project to introduce computers into Egyptian schools, the department has ordered 600 Master series micros.

And to mark the start of the project Britain's Secretary of State for Education and Science, Kenneth Baker, visited Egypt as the guest of the Minister of Education, and presented him with an Acorn Archimedes 440.

Acorn's managing director Harvey Coleman, who accompanied Kenneth Baker at the presentations, is optimistic that the deal will be the first of many.

"We will continue to develop links with the Egyptian authorities with a view to a long term commitment to the country's educational computing needs", he said.

Barbarian winners

CARDIFF Arms Park will be the scene of a bicentenary match of epic proportions when Rugby giants the Barbarians and the Australian tourists clash in November.

Joining the crowds – and going behind the scenes to meet the teams – will be Richard Williams from Bury who landed first prize in Superior Software's recent competition in *The Micro User*.

Superior sponsored the competition to celebrate the launch of the BBC Micro version of Barbarian. There was a staggering number of correct entries, but Richard's was the first drawn, and in addition to his day out in Cardiff he'll be taking away four Superior games.

Second out of the sack was D. Acreman from Cambridge, who will be receiving a copy of The Martini A-Z of Fencing and three superb games from Superior.

The 30 runners-up prizes of a game of their choice will be going to: R. Pallett, Cowplain; E.A. Cook, Llanfrechfa; I. Summers, Dartford; R.J. Attwood, Reme; O. Simkin, Headington; M.D. Tucker, Chippenham; R. Swift, Kegworth; E. James, West Bridgford; C. Parsons, Creigvau; S. Martin, Vale; D. Browne, Horsham; M. Fletcher, Chalgrove; B.E. Browne, Horsham; S. Donnelly, Bangor; J. Saunders, Mansfield; E. Wong, Tasmania; W. Bush-Harris, Brighton; R.J. Waters, Colchester; M. Hazelwood, Paignton; J.M. Browne, Horsham; A. Allen, Felixstowe; P. Southall, Cheam; I. Macdonald, Alloway; O. Love, Gosforth; D. Littlechild, Iver; S. Remordina, Reading; M. Walker, Stamford; D. Brown, Basingstoke; M. Stuart, Borehamwood; and G. Pearce, Pontypridd.

All the Fax

AN Archimedes version is now available of the Fax*file organiser from Mewsoft (01-267 2642), price £23.95.

Also new from Mewsoft is an A4 Forms Designer for the BBC Micro with shadow ram, Master and Compact. Price £10.95, it requires Epson CRT graphics.

Archimedes Podule

A plug in podule which accepts up to 7 ROMS or RAM chips (each chip can be up to 128K bytes). Optional battery back-up for the RAM. Includes a full-feature RAM filing system (fully ADFS compatible) allowing storage of files up to a possible 896K bytes, as if they were on disc. Easy to install and comes with a full manual. NB: requires prior installation of a podule backplane. £49.00 + VAT or £59.00 + VAT with battery.

Speech System

Used in conjunction with the TMS 5220, the Speech System (Speech ROM and Text to Speech ROM) enables BBC B users to easily produce the entire range of English speech and intonation from their machines. NEW PRICE: £25.00 + VAT (+£5.75 for the 5220 if required).

Accelerator

The most comprehensive BBC BASIC compiler, with full floating point arithmetic. Can compile to an intermediate G code, which ensures that the object code is compact, but utilities are also provided to convert G code to faster machine code. NEW PRICE: £30.00 + VAT.

Mega-3

Recently released version of Inter-Word, Inter-Sheet and Inter-Chart, all on one 128K chip. BBC: £85.00 + VAT (ask for details of exchanges).

SOFTWARE FOR THE BBC MICRO & ARCHIMEDES

Wordwise Plus

A 40 column word processor with a flexible and simple BASIC type programming language for user specific programs. On ROM for the BBC, disc for the Archimedes.
BBC: £49.00 + VAT.
Archimedes: £20.00 + VAT.

Spell-Master

A 128K spelling checker on ROM, with a 57,000 word dictionary. Can check as you type in Wordwise, Interword or View, allows creation of user dictionaries & dictionary browsing. Crossword, anagram and fuzzy checking features. A completely new version for the Archimedes, with extra features. BBC, Archimedes and Z88: £51.30 + VAT.

Computer Concepts Ltd

Inter-Word

A full WYSIWYG word processor on ROM. Features include ruler controlled margins and tabs, simultaneous on screen display of printer highlights and text alignment, multi column printing, multi file operation, 40/80/120 column screen modes. BBC: £49.00 + VAT. Archimedes: £39.00 + VAT.

Inter-Sheet

An easy to use spreadsheet on ROM. Features include 255 rows × 64 columns with individually adjustable width, full range mathematical functions, selective printing, lockable boxes/rows/ columns, 40/80/132 column screen modes, auto step on. BBC: £49.00 + VAT. Archimedes: £39.00 + VAT.

Inter-Chart

A comprehensive chart and graph plotting program on ROM. Features include bar graphs, pie charts and line graphs (up to 16 in memory at once, overlay/print in any combination) auto/manual labelling, accepts data from file/keyboard. BBC: £32.00 + VAT. Archimedes: £25.00 + VAT.

Inter-Base

A database on ROM, based around a powerful programming language. Features of the card index program include menu operation, variable field length & number of fields per record, unlimited records, full conditional search & sort, fast search via indexes. BBC: £60.00 + VAT.

Gaddesden Place Hemel Hempstead Herts HP2 6EX Telephone 0442 63933
(Access & Barclaycard accepted)

NEWS beat

THE 20th Electron and BBC Micro User Show, set to take place at the New Horticultural Hall, Greycoat Street, London on November 11 to 13, promises to offer something for everyone.

More than 50 exhibitors will be in attendance, many of them launching new products for the Electron, BBC Micro and Archimedes. And there'll be bargains galore for pre-Christmas shoppers.

A highlight of the November show will be the Wonderful World of the Archimedes, which will give visitors a chance to assess the power and versatility of Acorn's flagship machine.

And the show be also be the platform for the announcement of the recipients of this year's Micro User Innovations Awards. All the finalists will be on hand to demonstrate their novel applications – and visitors will be able to have their say in picking the final winners.

Archimedes will star at the big show

BBC Micro owners will have the opportunity to see the full range of Computer Concepts' software and hardware Risc developments for the Archimedes and the PC at the show.

Visitors will be able to see Riscard, the company's 32 bit Risc processor board – effectively a computer on a card – and to check current progress on Impulse which is their new multi-tasking, multi-processor parallel operating system designed to support Computer Concepts' own application software. The company's word processor/DTP package will also be demonstrated.

On sale for the first time will be the Fax Pack modem, a plug in card that gives the Archimedes the power to communicate with any similarly equipped Archimedes or Group 3 fax machine anywhere in the world.

Features include auto dial and answer, and the ability to scale, crop and scroll faxes onscreen. There is also an option of a 200 dpi, A4 width hand scanner, which allows any printed document to be digitised and saved in a suitable fax file format.

Computer Concepts will also be selling its latest software for the BBC Micro – including the new version of Inter-Base, for Archimedes and Z88.

★ ★ ★

WITH offerings for both the BBC Micro and Archimedes, Coltonsoft is intent on making its presence felt at the show.

Most prominent will be Pipedream, which will be up and running on the Archimedes. The package combines word processing, database and spreadsheet facilities and allows all three activities to be carried out in the same window of a document, eliminating the need for cutting and pasting

Pipedream is not a new product, but the show provides an ideal platform for Coltonsoft to demonstrate its versatility – the package is built into Cambridge Computer's Z88, and file transfer between the portable and the Archimedes is now very easy to achieve.

A complementary package, Pipedream Spell Check, will also be on show. Spell Check offers an 80,000 word dictionary and a 40,000 words per minute checking speed.

Included are a "check as you type" option and full dictionary searching facilities.

★ ★ ★

AFTER a hectic summer catering to the demands of Electron users, Pres is gearing up for a new product launch at the November show – time permitting.

"We expected a quiet period during which we could get on with designing new products", said Pres boss John Huddleston.

"Instead we've been working flat out to meet demand for existing products while still maintaining a heavy programme of new product development.

"But we're very encouraged that people appreciate our strategy of upward compatibility to the BBC Micro range in the design of our products".

Interest has been particularly keen in the company's AP7 battery backed ram, Advanced Games Compendiums and Music 5000 synthesiser, all of which will be on display at the show.

However, Pres is not content with resting on its laurels: Work continues on the Advanced Basic Editor+, Advanced File Manager and the 1MHz Bus unit. "The AFM is currently being documented and should be ready for launch at the show", said Huddleston.

One of Watford's Aries range

★ ★ ★

NOVEMBER marks Watford Electronics' 16th anniversary, an event the company is celebrating with the launch of its Aries range of PC AT and XT machines.

Also on demonstration at the show will be Watford's state of the art, IBM compatible, high resolution monochrome and colour monitors.

Watford will not be neglecting BBC Micro and Archimedes users, however. More new products will be on display here, including the Wapping Editor, Archimedes Digitiser and the Arc 20Mb and 40Mb Winchester drives.

As usual, Watford's staff will be on hand to answer any technical queries and there will be a number of special Christmas offers.

★ ★ ★

THERE will be no shortage of choice on the Impact Games stand, which will offer a comprehensive range of titles for all Acorn machines.

All the latest releases will be there, plus a wide range of titles at bargain prices – and visitors spending more than £4 will be entitled to choose from a wide range of unique free helpsheets, solutions and maps.

Impact will also be showing its own range of software,

SOFTWARE AT BARGAIN PRICES

ACORN TELETEXT ADAPTORS

complete with manual +
TFS ROM for all BBC/Master

RRP ~~£229~~ **OUR PRICE £89.95**

CURRENT TITLES	Cass	Disk
Spycat	7.50	9.95
Icarus	7.50	9.95
Tetris	6.95	9.95
Boulderdash	7.50	11.95
Indoor Sports	7.50	11.95
Quest	7.50	9.95
Play It Again Sam II	7.50	9.95
Kourtyard	7.50	9.95
Skirmish	7.50	9.95
The Lost Crystal	9.95	11.95
Spellbinder	7.50	9.95
Life of Repton	5.50	6.50
Elixir	7.50	9.95
Bonecruncher	7.50	9.95
Despatch Rider	6.00	8.95
Impact	7.50	9.95
Ransack	7.50	9.95
Ziggy	6.00	8.95
Graham Gooch Cricket	6.50	9.95
Thunderstruck II	6.50	9.95
Spy v Spy	7.50	9.95
Phantom (Tynesoft)	6.50	9.95
Winter Olympiad	7.50	12.50
Village of Lost Souls	7.50	10.50
Project Thesius	7.50	10.50
Rick Hanson Trilogy	18.00	21.00
Play It Again Sam	7.50	9.95
Spitfire 40	7.50	10.95
Palace of Magic	7.50	9.95
Crazy Rider	7.50	9.95
Codename Droid	7.50	9.95
Repton 40 Screens	5.50	6.75
Revs + 4 Tracks	10.50	12.95
Grand Prix Construction	7.50	9.95
Superior Collection Vol1	7.50	9.95
Superior Collection Vol2	7.50	9.95
Colossus Chess	7.50	12.95
The Hunt	7.50	10.95
Paperboy	7.50	12.95
Elite	10.50	10.95
Star Wars	7.50	10.95
Evening Star	7.50	9.95

LATEST TITLES

	Tape	Disc
Repton through Time	5.50	6.50
Saigon	7.50	11.95
Barbarian	7.50	9.95
Steve Davis Snooker	1.99	4.99
Shark	7.50	9.95
Breakthrough	7.50	9.95

NEW

From Superior

PIPELINE & PLAY IT AGAIN SAM III

Disk £9.95 Tape £7.50

ACORN ELECTRON

with Power Supply +
Manual + 20 Piece
Software Pack

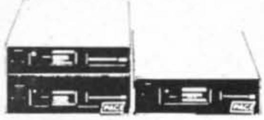
£59.95

ACORN DISC DRIVE

40 track/100k

£39.95

PACE Disc Drives



400K Single £99.00

800K Dual £189.00

800K Dual with PSU £209.00

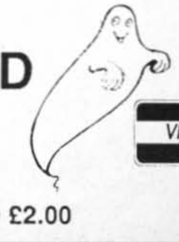
All disc drives fitted with 40/80T switch.
Prices include VAT, but please add £3.00 P&P

BBC SECOND PROCESSORS

6502 – Z80 – IEEE 48
32016 – PRESTEL – ARM
TELETEXT

Ring for Price & Availability

TOWERHILL COMPUTERS LTD



Unit 5, Acacia Close,
Cherry Court Way Ind Est, Leighton Buzzard, Bedfordshire
Telephone: Leighton Buzzard (0525) 385329

ALL PRICES INCLUDE V.A.T. AND P&P. OVERSEAS ORDERS ADD £2.00

NEWS beat

HUNT FOR THE GRAIL

MICRO User readers will be taking part in a treasure hunt to find the secret hiding place of a £5,000 "replica" of the legendary Holy Grail.

The nationwide quest has been organised by Mandarin Software (0625 878888) to mark the launch of Lancelot, a graphic adventure game based on the legend of King Arthur.

Hand-crafted from sterling silver and gilded inside with 22 carat gold, the 7in high goblet is encrusted with semi-precious stones. It is hidden at a secret location somewhere in the UK.

To find the prize, entrants will have to survive a two-stage contest based on clues contained in the new three-adventure Lancelot package.

Contest creator and Arthurian expert Pete Austin said: "All people need to do is study the Lancelot game carefully and the clues – plus their answers – will become obvious". Price £14.95.

They're on show at the show

including three volumes of Cheat It Again, Joe – collections of "cheats" for some 20 games including such classics as Elite, Citadel and all the Repton series.

Loaded before the main game, the cheats provide options such as unlimited lives, immortality and access to higher levels. "They will give games players a lot more fun and will allow them to see far more than ever before" says Impact's Mark Botterill. "Citadel is an absolute doddle to complete and even I have now achieved Elite status".

The cheats have been designed to work with both original and compilation versions wherever possible and require no technical knowledge or typing. Prices are £2.99 on BBC Micro or Electron cassette, £4.99 on BBC Micro 5.25in disc.

In more original vein Impact will be launching Clogger – a new disc-only arcade adventure with 18 levels priced at £4.99 for the BBC Micro, £6.95 for the Master Compact version – and Quazer, Impact's first release for the Archimedes.

Quazer is a superfast action shoot-'em-up which shows off the speed, graphics and speed capabilities of the Risc technology. Price £9.50.

★ ★ ★

FIVE spectacular new releases will make their debut at the show, courtesy of Superior Software.

A confident Superior is inviting visitors "to come along and see the best games at the best show ever" and is claiming that the new range includes "some of the most impressive games ever released for the range of Acorn machines".

Superior is aiming to put out two or three games each month as a run up to Christmas, and promises that more games than ever before are in the pipeline.

★ ★ ★

ARMADILLO Systems, making its first visit to the show, will be displaying a trio of products for the Archimedes.

Pride of place goes to the A616 16 bit sound sampling package. This, says Armadillo director Milton Wynne is "designed for the more discerning user who demands both performance and quality in software and hardware".

The package comes complete with Midi in, through and out, stereo 16 bit (CD) quality sampling with four times oversampling at the output stage, producing excellent sound quality.

The board is a double card which will fit either the Archimedes 300 or 400 series and the software provides everything necessary to start using samples as a Midi "instrument" – using a Midi keyboard – within minutes.

Also on show will be Armadillo's A448b 8 bit sound sampling package, an updated version of its 8 bit sampler. The new version includes a stereo facility and an optional Midi interface. Armadillo's transform module – Spectre Fourier analysis software – completes the round up.

The software is supplied with a harmonics editing and 3D display package which allows any function to be applied to a waveform.

★ ★ ★

COMPUTER music pioneer Hybrid Technology is planning to launch a major new music package for the BBC Micro at the show.

The Music 5000 Synthesiser Junior is a low-cost entry level version of Hybrid's well established Music 5000 Synthesiser and has been specifically designed for those new to computer music making.

It uses powerful rom-based icon driven graphic music software which includes an easy-to-use music editor, mixing editor and desk, sound designer and qwerty music keyboard.

The Junior can be upgraded to full Music 5000 specification with the addition of an Ample rom, giving complete compatibility with the Music 4000 Keyboard and the other components of the Hybrid Music System.

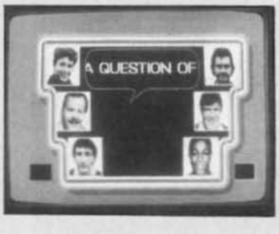
Both the Junior and the full Hybrid Music System will be on continuous demonstration at the show.

★ ★ ★

CONCENTRATING on keeping micro users in touch, Beebug will be demonstrating its new communications package – Hearsay – written specifically for the Archimedes.

Hearsay is easy to use, fully exploiting the Archimedes' WIMP environment, and no technical knowledge is required: That said, there are enough advanced features to make it equally valuable to experienced users.

Ideal for use with Prestel, Telecom Gold, MicroLink and bulletin boards, Hearsay emulates VT220, VT100, VT52, Ansi (IBM), Viewdata (Prestel), Tektronix, TTNS and Teletype terminals.



BASED on the perennial TV series, A Question of Sport is now a program for the BBC Micro from Elite (0543 414188).

"We successfully fought off competition from Domark, Gremlin Graphics, Prism and British Telecom to acquire the licence", said Elite's Gill Birch.

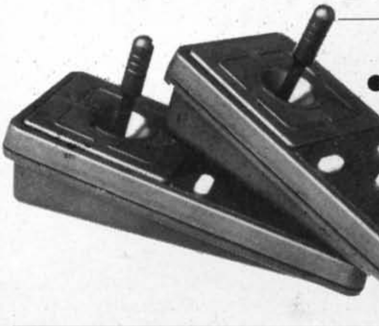
"The computer game will include all the features which have made the TV programme so popular – including the picture board, what happened next, and home-and-away.

"There are a host of sports stars from whom to choose your teams and you can even confer with your partners". Price £14.99 on cassette, £19.99 on disc.

VOLTMACE

Archimedes COMPATIBLE

COMPATIBLE



● DELTA 3B TWIN

FOR A BBC A, B, B+, MASTER, ARCHIMEDES & ELECTRON PLUS 1

DELTA 3B TWIN – £21.95

2 joysticks wired to one plug.
As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.

DELTA 3B SINGLE £14.95

A single joystick that in some ways can act as two. The custom made potentiometers are wired so that it will work as a left hand or right hand joystick. It can run some programs written for two joysticks and has two independant fire functions.

DELTA 14B AVAILABLE FOR BBC A, B, B+ & MASTER £16.95

Our original ACORN/BBC handset. The same super light joystick, but with 14 long life buttons, video game tested for many years. A DELTA14B/1 is needed to run the keypad but a 14B on it's own will work as a joystick and fire buttons, so you can always add the 14B/1 to it later.

DELTA 14B/1 for use with 1 or 2 DELTA 14B's £16.95
DELTA DRIVER CASSETTE, AD OR DISK

The A/D/USER PORT interface box. This gives simultaneous access to both the analogue port, for the joystick part and the user port, for the keypad. Two handsets can be plugged into the box giving a total of 24 user definable keys.
N.B. On a Master a small extension lead is needed to clear the RGB socket (£5.95 extra).
Full instructions are provided to include the keypad in your own programs even in BASIC or for the non-programmer a DELTA DRIVER cassette is available with keyboard to joystick/keypad conversions and keypad set up programs.

FOR THE MASTER COMPACT OR ELECTRON FITTED WITH A SWITCHED JOYSTICK INTERFACE

DELTA 3S £14.95

For an ELECTRON with a switched joystick interface (not a PLUS 1) this gives you the same delightful light, fast action of the DELTA joysticks but fitted with a 9 way D plug as per Atari, Commodore, etc. and will run on First Byte interface or similar.

DISCOFLEX AND ISODATA COMPUTER CONTROLLED DISCO LIGHTS

3 coloured 3" reflector bulbs in a 16" high, 5" wide steel case, with individual level controls.
The Isodata 6 unit plugs into the user port and connects to 1 or 2 Discoflex lamp units, allowing simple software control of 6 lamps opto-isolated from the computer.
If you do not want to control the lights from the computer, switch them to auto-mode and they will react to the sound of music.

Discoflex 3 lamp unit	**£29.95**
Isodata 6 opto-isolator	**£19.95**

Compact COMPATIBLE

● DELTA 3S

TEAC 40/80 TRACK SWITCHABLE 5.25" DISC DRIVES

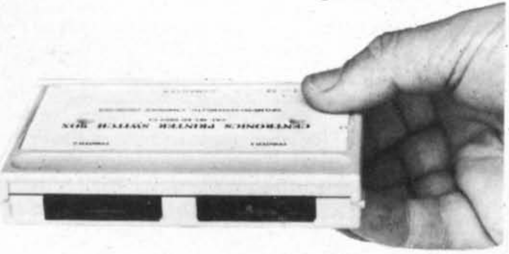
Bare Drives fitted with a switch on the front	£80.00
As above, cased with BBC leads	£95.00
As above, with power supply	£115.00
Archimedes buffered interface	£22.00
Watford D/D DFS kit	£44.85
DFS Manual	£6.95

SINGLE DISC DRIVES – STEEL CASES, WITH LEADS

DS/DD 80T 5.25" (Olivetti)	£84.95
DS/DD 40T 5.25" (Toshiba)	£74.95
2764 Eproms used once, erased, guaranteed	£1.75
TV aerial/computer switches	£2.00

UNBRANDED GUARANTEED DISCS

10 5.25" 40Tr Double sided	£4.95
10 5.25" 80Tr Double sided	£4.95
10 3.5" 135TPI – DS/DD	£10.95
Disc-Drive head cleaner kits –Liquid type – non-abrasive 3.5" or 5.25"	£3.95



●DATAPRINT 2P

DATAPRINT 2P and 2C LOW COST – LOW PROFILE – COMPUTER PRINTER SHARER £34.95

A neat small unit which is just 125x90x20mm allows two parallel printers to be connected to one computer and simply switched between the two. e.g. one printer for paper and one for labels or the 2C allows two computers to share 1 printer.
Sharer to Printer leads/Computer to Sharer leads £5.00

● DATAPAD 16B

DATAPAD 16B £39.95

A commercial spec. 16 way keypad. Full travel mechanical keys with double shot moulded keycaps mounted in a low profile metal case. The keys are marked with calculator legend, but the software included allows the pad to be defined as any keys, including function keys or single byte VDU commands such as PRINTER ON/OFF. No tampering with the computer as it fits onto the user port.

Access

All prices include VAT + P&P
Joysticks are available from your dealer or direct from us on (0462) 894410
Special offers only available direct

VISA

Unit 9, Bondor Business Centre, London Road, Baldock, Herts. SG7 6NG. Telephone (0462) 894410

THE IMPACT GAMES CLUB

OUR GUARANTEE

1. Over 250 titles always in stock.
2. Over 98% of orders despatched the day they received by 1st class post.
3. We immediately replace any faulty games purchased from us.
4. Prices are fully inclusive - nothing else to pay.
5. Plus we'll send you a copy of our club magazine with lots more games, game reviews and bargains galore!

CHEAT IT AGAIN, JOE
(Impact)

Volume 1 – Great cheats for 20 great games. Includes cheats for Elite, Citadel, Ravenskull, Thrust, Repton 1&2, Star Wars, Quest, Bonecruncher, Elixir, Thunderstruck 2, Arcadians, Starship Command, Phantom, Despatch Rider, Deathstar and Many more.
Volume 2– Lots more amazing cheats to make life easier. Including – Repton 3, Around the World, Life of Repton, Codename: Droid, Icarus, Impact, Planetoid, Magic Mushrooms, Ransack, Imogen and many more.

NEW

BBC 'B' or Electron Cassettes	£2.99
BBC 5 1/4" Discs	£4.99

ARCHIMEDES GAMES

NEW Quazer (Impact Software)	11.95
NEW Orion (Minerva)	11.95
NEW Freddy's Folly (Minerva)	11.95
NEW Alerion (Dabs Press)	12.95
Terramex (Grandslam)	15.95
Zarch (Superior)	15.95
Hoverbod (Minerva)	11.95
Missile Control (Minerva)	11.95
Conqueror (Superior)	19.95
Enthar Seven (Robico)	24.95
Minotaur (Minerva)	11.95

FREE HELPSHEETS/MAPS

Spend over £4 on games and you may choose any ONE of the following helpsheets/solutions and maps absolutely FREE:- Spend over £10 and you may choose any TWO FREE:-

Spycat	(Solution + map)	Elite	(Helpsheet + tips)	Impact	(Helpsheets + passwords)
Plan B	(Solution + map)	Tarzan	(Solution + map)	Icarus	(Helpsheet + maps)
Quest	(Solution + map)	Stranded	(Solution)	Sphinx Adventure	(Solution)
Ravenskull	(Solution + 4 maps)	Codename: Droid	(Solution + map)	Anarchy Zone	(Helpsheet + passwords)
Citadel	(Solution + map)	Thunderstruck	(Solution + map)	Philosopher's Quest	(Solution + map)
Plan B 2	(Solution + map)	Thunderstruck 2	(Solution + map)	Repton 2	(Helpsheet + 18 maps)
Spy Vs Spy	(Helpsheet)	The Lost Crystal	(Solution)	Bonecruncher	(Passwords + 10 maps)
Spellbinder	(Solution + maps)	Suds	(Solution)	Skirmish	(Helpsheet)
Elixer	(Solution + maps)	Kourtyard	(Helpsheet + map)	Imogen	(Solution)
Paperboy	(Helpsheet)	Dunjunz	(Helpsheet + map)	Cholo	(Solution)
Twin Kingdom Valley	(Solution + map)	Gisburnes Castle	(Solution + map)	Quest for Freedom	(Solution + map)
Omega Orb	(Solution + map)	Palace of Magic	(Solution + map)		

PIPELINE
(Superior)

At last the long awaited sequel to the excellent Ravenskull. The game is in a new scenario, the moon Io, and it is your task to prevent mutant androids from destroying the Sulphur plant which is providing Earth with much needed resources. Infinitely superior to Ravenskull, Pipeline features larger screens, more puzzles and superb graphics and screen designer to allow you to create a whole new game if you wish. Highly recommended.

NEW

BBC or Electron Cassette	£7.50
BBC 5 1/4" Disc	£9.50
Master Compact 3 1/2" Disc	£11.95

★= Electron disc available
M = Master compatible

TITLE & PUBLISHER	BBC or Electron Cassette	BBC (or Electron) 5¼" Disc	Master Compact or Electron 3½" Discs
SUPERIOR			
Play It Again, Sam 3 M	7.50	9.50	11.95
Pipeline M	7.50	9.50	11.95
Repton Thru Time M	5.50	6.35	7.50
Barbarian M	7.50	9.50	11.95
Spycat M	7.50	9.50	11.95
Quest M	7.50	5.95	11.95
Play it Again Sam 2M	7.50	9.50	11.95
Bonecruncher M	7.50	9.50*	11.95
Spellbinder M	7.50	9.50*	11.95
Play it Again Sam M	7.50	9.50*	11.95*
The Life of Repton M	5.50	6.35*	7.50
Elixir M	7.50	9.50*	11.95*
Palace of Magic M	7.50	9.50*	11.95*
Repton Around the World M	5.50	6.35	7.50
Crazee Rider M	7.50	9.50	11.95*
Codename: Droid (Stryker's) M	7.50	9.50	11.95*
Grand Prix Cons. Set M(BBC only)	7.50	9.50	9.50
Repton 3 M	7.50	9.50	11.95
Revs & 4 Tracks (BBC only) M	10.35	11.95	15.95
Elite M	10.35	11.95	15.95
Acorn Hits Vol 1 or 2 M	4.95	9.50	11.95
Sup. Coll. 1 or 2 (BBC only) M	7.50	9.50	11.95
Superior Coll. 3 (Elec Only)	7.50	9.50	11.95*
Speech (BBC only) M	7.50	9.50	11.95
Citadel M	7.50	9.50	11.95
Ravenskull M	7.50	9.50	11.95
Thrust M	3.99	9.50	11.95
Galaforce M*	7.50	9.50	11.95
TYNESOFT			
Summer Olympiad M	7.50	11.95	-
Sargon M	7.50	11.95	-
Winter Olympiad '88 M	7.50	11.95	11.95
Spy vs Spy M	7.50	11.95	11.95
The Big K.O M	6.35	10.35	10.35
Boulderdash M	7.50	11.95	11.95
Indoor Sports M	7.50	11.95	11.95
Phantom M	6.35	10.35	10.35
Oxbridge M	6.35	-	-
Commonwealth Games M	6.35	10.35	10.35
Future Shock M	7.50	11.95	11.95
Microvalue (4 games)	3.99	-	-
Microvalue 2 (4 games) Elec	3.99	-	-
Microvalue 3 (4 games) Only	3.99	-	
Microvalue Gold	3.99	-	
MICROPOWER (State 40 or 80 Track when ordering Discs)			
Imogen (BBC Only) M	5.95	6.95	7.50
Dr Who (BBC Only) M	5.95	-	7.50
Micropower Magic 1 M (BBC Only)	5.95	5.95	5.95
Micropower Magic 2 M (BBC Only)	5.95	5.95	5.95
MIRRORSOFT			
Tetris M	2.99	4.99	-
Spitfire 40 M	4.95	4.99	6.95
Strike Force Harrier	4.95	4.99	-
GODAX			
Skirmish M	4.95	4.99	6.95
Kourtyard M	4.95	4.99	6.95
DATABASE SOFTWARE			
Starquake (BBC Only) M	7.50	9.50	-
Mini Office 2 (BBC B ONLY)	11.50	13.95	17.95
Mini Office 2 (Master Disc)	-	15.95	-

M = Master compatible

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5¼" Disc
ACORNSOFT		
Revs & Revs 4 Tracks(BBC Only)	4.95	4.99
ASL		
Shark M	7.50	9.50
Breakthrough M	7.50	9.50
Impact M	7.50	9.50
Powerpack 1 (7 games) |Elec	4.95	-
Powerpack 2 (7 games) |Onl	4.95	-
Ziggy M	6.95	8.75
Ransack M	6.95	7.95
Despatch Rider M	6.95	7.95
Thunderstruck	2.99	-
Thunderstruck 2 M	2.99	4.99
Sphere of Destiny M	6.35	9.50
Omega Orb M	2.99	4.99
Graham Gooch Test Cricket M	7.50	9.50
BBC SOFT		
Bismark(BBC Only) M	-	11.95
Black Queen (BBC Only M)	-	11.95
White Knight Mk12 (BBC Only) M	-	11.95
BEAU JOLLY		
Five Star Games 1 (5 games)	4.95	-
Five Star Games 2 (5 games)	4.95	-
Five Star Games 3 (7 games)	7.50	-
Computer Hits 3 (10 games)	4.95	-
Computer Hits 4 (12 games)	7.50	-
Computer Hits 5 (5 games)	4.95	-
BUGBYTE		
Bugbyte Comp. 1 (4 games) M	-	4.99
Bugbyte Comp 2 (4 games)	-	4.99
Dunjunz M	2.99	4.99
CDS		
Colossus Bridge M	9.50	11.95
Colossus Chess M	7.50	11.95
Steve Davis Snooker M	1.99	4.99
Brian Clough Football M	7.50	9.50
CODA SOFTWARE		
Headcoach M	-	14.95
DESIGN PEOPLE		
Sink The Bismark M	-	8.95
Tanks M	-	10.95
Battle of Britain M (BBC Only)	7.50	10.95
DOMARK		
Empire Strikes Back (BBC Only) M	7.50	10.35
Not a Penny More (BBC Only) M	11.95	15.95
Star Wars M	7.50	10.35
Living Daylights (BBC Only) M	7.50	10.35
Trivial Pursuits (All BBC Only)		
Genus Edition M	11.95	15.95
Young Players M	11.95	15.95
Baby Boomer M	11.95	15.95
Bulls Eye (BBC Only)	6.35	-
Countdown (BBC Only)	6.35	-
Treasure Hunt (BBC Only)	6.35	-
ELITE		
Paperboy M	7.50	11.95
Commando (BBC Only)	7.50	-
EPIC SOFTWARE		
The Lost Crystal M	9.50	10.95
The Wheel of Fortune (Elec Only)	4.95	-
Castle Frankenstein (Elec Only)	4.95	-
The Quest for the Holy Grail (Elec Only)	4.95	-
The Kingdom of Klein (Elec Only)	4.95	-
ELK ADVENTURE CLUB		
The Axe of Kolt	4.75	-
Starship Quest	3.95	-
Magnetic Moon	3.95	-

M = Master compatible

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5¼" Disc
FIREBIRD		
Sentinal (BBC Only) M	7.50	11.95
Cholo (BBC Only) M	-	14.35
GRAND SLAM		
World War 1 (BBC ONLY)	-	9.95
GREMLIN GRAPHICS		
Krakout (BBC Only) M	7.50	11.95
Footballer of the Year	7.50	
HEWSON		
Evening Star M	7.50	11.95
Uridium (BBC Only) M	7.50	11.95
HEYLEY SOFTWARE (State 40 or 80 Track) (All BBC Only)		
The Ultimate Prize M	-	5.35
Pirates Peril M	-	6.35
Dream Time M	-	6.35
The Taroda Scheme M	-	6.35
Stranded M	-	6.95
IMPACT SOFTWARE (Discs are BBC B & Master Compatible 40/80		
Cheat It Again, Joe 1	2.99	4.99
Cheat It Again, Joe 2	2.99	4.99
INFORGRAMME		
Apocalypse (BBC Only)	7.50	11.95
LOGOTRON		
XOR M	7.50	10.35
LEISURE GENIUS		
Scrabble (BBC Only)	10.35	11.95
Monopoly (BBC Only)	10.35	11.95
LOTHLORIAN		
Roundheads (BBC Only) M	-	9.95
MANDARIN		
Icarus M	7.50	9.50
Time and Magik (80 Track Only, BBC B with sideways/shadow RAM, B+, Master) M	-	11.95
MARTECH		
War (BBC Only)	-	4.99
MOSIAC		
Yes Prime Minister M	11.95	15.95
ROBICO (State 40 or 80 Track when ordering disks)		
Enthar Seven M	-	14.35
Island of Xaan (BBC Only) M	7.50	10.35
Rick Hanson Trilogy M	17.50	20.95
Project Thesius M	7.50	10.95
Myorem M	7.50	10.35
The Hunt M	7.50	10.35
Village of Lost Souls M	7.50	10.35
TOPOLOGIKA (Text Adventures 51/4" state 40 or 80 tracks)		
Return to Doom M	-	10.35
Kingdom of Hamil M	-	7.95
Countdown to Doom M	-	7.95
Acheton M	-	7.95
Philospher's Quest M	-	7.95

BUDGET CASSETTES
BBC or Electron

ACORNSOFT	
Magic Mushrooms |ALL	1.99
Snooker |BBC ONLY	1.99
Starship Command (Elec Only)	1.99
ADDICTIVE	
Football Manager	2.99
ALTERNATIVE SOFTWARE	
[illegible]	1.99
Combat Lynx	1.99
Red Arrows (BBC Only)	1.99
Crazy Erbert	1.99
Olympic Spectacular	1.99
Soccer Boss	1.99
Licence to Kill (Elec Only)	1.99
Video Pinball	1.99
Triple Deckers 1 to 10 (each)	1.99
[illegible]	1.99
[illegible]	1.99
ATLANTIS	
Frankenstein	1.99
Anarchy Zone	1.99
Pro - Golf	2.99
League Challenge	2.99
Survivors	2.99
Cops and Robbers	1.99
Creepy Cave	1.99
Panik	1.99
BLUE RIBBON	
Steve Davis Snooker	1.99
3D Dotty	1.99
Return of R2	1.99
Bar Billiards	1.99
Mango	1.99
Trapper	1.99
Video Card Arcade	1.99
Nightmare Maze	1.99
Ravage	1.99
Darts	1.99
Golf	1.99
BUGBYTE	
Robotz	2.99
Plan B2	2.99
Plan B	2.99
Hunky Dory	2.99
Uranians	2.99
Twin Kingdom Valley	2.99
Megarock (BBC only)	2.99
Tennis	2.99
Cricket	2.99
Ice Hockey	2.99
Starforce 7	2.99
Squeakaliser	2.99
[illegible]	2.99
Dunjunz	2.99
DOCTORSOFT	
Phantom Combat	2.99
FIREBIRD	
The Hacker	1.99
Star Drifter	1.99
GREMLIN GRAPHICS	
Footballer of the year	2.99
MICROPOWER	
Gauntlet	1.99
Bumble Bee	1.99
Felix in the Factory	1.99
Fruit Monsters (Elec Only)	1.99
Chess	1.99
Stock Car	1.99
Swoop	1.99
Killer Gorilla	1.99
Danger UXB (Elec Only)	
Cybertron Mission	1.99
Bandits	1.99
The Mine (Elec Only)	1.99
Croaker	1.99
Felix/Weevils (Elec Only)	1.99
THE MICRO SELECTION	
The Boxing (Elec Only)	1.99
Flight Path 737 (elec Only)	1.99
RICOCHET	
Beach Head	2.99
Gisburnes Castle	1.99
Brian Jacks Super Challenge	1.99
Geoff Capes Strongman	1.99
Galactic Patrol	1.99
Vegas Jackpot	1.99
Eddie Kid Jump Challenge	1.99
SUPERIOR	
Repton	1.99
Repton 2	2.99
Deathstar	1.99
Tempest	1.99
Karate Combat	2.99
Thrust	3.99
Overdrive	1.99
Chess (BBC Only)	1.99
TOP TEN	
[illegible]	2.99
Peter Scott Trilogy (BBC only)	1.99
[illegible]	1.99
TYNESOFT (ALL ELEC ONLY)	
[illegible]	2.99
Hyperdrive	2.99
[illegible]	2.99
3D Bomb Alley	1.99

HOW TO ORDER

Simply fill in this coupon and send with a cheque or a postal order to Impact Posters.

- All games despatched by 1st class post
- FREE postage and packing (Overseas add £1)
- Despatch normally same dayas order (over 98%)

IMPACT Posters

Impact Posters
Neepsend House
1 Percy St.
Sheffield S3 8AU
Tel. (0742) 769950

To : Impact Posters, Neepsend House, 1 Percy St; Sheffield, S3 8AU

Please send me the following games :

TITLE	FORMAT (Cassette etc.)	COMPUTER	PRICE
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....

I enclose a cheque, P/O (made payable to Impact Posters) for £ ....

(BLOCK CAPITALS PLEASE)

Name..

Address..

....

....

Postcode..

Please send me **FREE** helpsheets/solutions/maps for the following games (from those above)

1. ....(Orders over £4)
2. ....(Orders over £10)

The Atari 520STFM

Of £450 wort

MARBLE MADNESS. £24.95
Electronic Arts.

TEST DRIVE. £24.95
Electronic Arts.

BEYOND THE ICE PALACE
000140

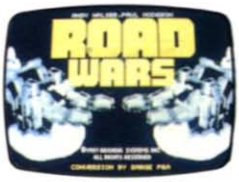
BEYOND THE ICE PALACE. £19.95
Elite.

BUGGY BOY. £19.95
Elite.

EDDIE EDWARDS SUPER SKI. £19.95
Elite.

IKARI WARF
Eli

CHOPPER X. £9.99
Mastertronic.



ROADWARS. £19.95
Melbourne House.

XENON. £19.95
Melbourne House.

ARKANOID II. £19.95
Imagine.

WIZBALL
ocean

WIZBALL. £19.95
Ocean.

BLACK LA
Firel

Here it is! The new Super Pack from Atari.

You don't just get the brilliant 520STFM. We're giving you twenty-two great software titles that most people would gladly sell their grannies for.

There's no catch. You really do get the 520STFM and £450 worth of great software titles for just £399.99.

So make sure you include yourself in this great offer.*

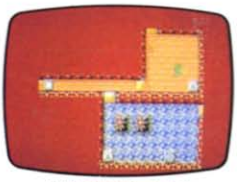
*Available from most Atari dealers. Offer ends March 1st 1989.

l. £399.99 inclusive.

ATARI
520ST

h of software.

:IORS. £14.95
te.



RANARAMA. £19.95
Hewson.

THUNDERCATS. £19.95
Elite.

ZYNAPS. £19.99
Hewson.

QUADRALIEN. £19.95
Logotron

STARQUAKE. £19.95
Mandarin.

MP. £19.95
ɔird.

GENESIS. £19.95
Firebird.

THRUST. £9.95
Firebird.

SECONDS OUT. £19.95
Tynesoft.

SUMMER OLYMPIAD 88. £19.95
Tynesoft.

ORGANISER BUSINESS
SOFTWARE. £49.95
Triangle Publishing.

Please send me details of this and other Atari Products
Name __________ Address __________
__________ Postcode __________
MU11
Atari Corp (UK) Ltd., Atari House, Railway Terrace, Slough, Berkshire SL2 5BZ

ATARI
SUPER PACK

Use TELECOM GOLD FREE* for a month!

Joining the comms revolution has never been easier!

The MicroLink Communications Pack offers you an inexpensive, high-speed link to the world outside your BBC Micro

The MicroLink Communications Pack contains everything you require to go online. There's a powerful modem that sits between your BBC Micro and your telephone, a lead to connect them together and easy-to-use communications software.

You'll also be given a unique invitation to join MicroLink, with FREE registration and telex validation (normally costing £15), and a month's FREE* connect-time to your MicroLink/Telecom Gold mailbox. So you can find out for yourself what MicroLink is all about without it costing you another penny.

Of course you can also use your MicroLink modem and software to access thousands of other services all over the world, from giant databases in the USA to innumerable privately-operated bulletin boards throughout Britain that cover a vast range of subjects.

What you receive with your MicroLink Communications Pack:

THE MODEM. *This is the MicroLink Multi-Speed modem, which operates at three speeds – 1200/75, 300/300 and the super-fast 1200/1200 full duplex. It is Hayes compatible and is fully BABT approved. Its many features include powerful auto-dial and auto-answer facilities, making it extremely easy to operate. The modem alone is unbeatable value – even without the software.*

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them

THE SOFTWARE. *The communications software that comes free with each modem is the complete Comms module from the acclaimed Mini Office II. To simplify preparing messages off line it also includes the COMPLETE Word Processor module of Mini Office II, which has many enhanced features not included in other word processors.*

A remarkable price breakthrough for a really exceptional package!

To take advantage of this very special offer simply complete and mail the coupon below.

£179 incl. VAT

MicroLink is Britain's fastest-growing electronic mail service. It offers ALL the services of Telecom Gold – and a whole lot more besides.

With MicroLink you can link up with other users all over the world to send and receive electronic mail. It turns your BBC into a telex machine – without the need for expensive equipment or special phone line. It lets you send telemessages for next-morning delivery to ANY home or business in the UK or USA.

With MicroLink you can tap into a weather satellite and see pictures from space displayed in colour on your BBC monitor. You can use it to obtain legal and financial advice, to order flowers or book theatre and rail tickets.

With MicroLink you can receive free telesoftware programs over the phone to feed into your BBC. Your can use it to turn text into typesetting or Braille. You can link in seconds to a database in New York, or key into the 400,000-word Great European Dictionary in Luxembourg. And it gives you direct access to up-to-the-minute financial information on every company in Britain.

** This exclusive offer relates to connect time only and does not include telephone, any possible PSS charges or surcharged services.*

ORDER FORM

Please supply:

☐ MicroLink multi-speed modem, software and BBC lead for £179

☐ FREE registration and telex validation, plus FREE one month's connect time to MicroLink

or

☐ I am already a subscriber to MicroLink

If you would like to join MicroLink and already have a modem and software simply tick the box alongside. You will then be sent full details of how to join. ☐

All prices include VAT & carriage (UK only)

☐ Cheque enclosed payable to: MicroLink Communications Ltd.

☐ Please debit my Access/Visa card number: Expiry date:

Signature..........

Name..........

Address..........

.... Postcode..........

Send to: **MicroLink Communications Ltd,**
FREEPOST, Macclesfield, Cheshire SK10 4YB.
Telephone orders: **0625 879920**
Orders by Prestel: **Key *89, then 614568383**
Via MicroLink/Telecom Gold: **72:MAG001**

MU11

Your technical questions answered by MIKE COOK

PROBLEM SOLVED

On the agenda...

- Linking up micros
- Picture display that disappears
- Talking to your printer
- A change of keyboards
- The cure for gibberish
- Cassette interface fault
- Pseudo-random numbers
- Double stepping disc drive

Linking different micros

I AM thinking of connecting my BBC Micro to a friend's computer of a different make. To do this I thought I could put a wire link between our houses, which are about 500 yards apart.

Would I need to use two modems and, if so, would I need to put a voltage on to the wire? Also would standard terminal software be suitable to run the system? – **Nigel Uprichard, Wickham, Newbury, Berks.**

● *The RS232 standard is nominally rated at 50 yards. However if you get special twisted pair cable this can be pushed up to approaching 1000 yards at low baud rates like 300 or 1200. If this will not work you can get high power line drivers to increase the range to what you want.*

However these alternatives are expensive and a cheaper solution is, as you suggest, a modem at each end of the line. Any terminal software can be used providing one end is capable of being made to run in the data originator mode and the other as data receiver. Conventionally, when you contact another micro you are the data originator because you rang it up.

Video problems

I WOULD be most grateful if you could spare a minute's help on the subject of your video digitiser programs in the May and June 1987 and February 1988 issues of *The Micro User*.

I have typed in the software and it gives correct results with Get it Right! and I've bought the assembled digitiser board from Musbury Consultants. But I am unable to get any picture display on my TV/monitor. Incidentally my video camera works perfectly when plugged directly into the TV aerial socket.

Also, please could you confirm that the program as written is suitable for the Master as indicated, and what should the effect be on the screen when S is pressed if no digitiser board is connected? – **Dr. L.M. Fenton, Uxbridge, Midddlesex.**

●*Your problem is your video source. If it works when you plug it in the aerial socket of a TV set then it must be producing UHF modulated video.*

The Body Build digitiser – and all similar video devices – requires a composite video signal like the one produced at the video out socket of the BBC Micro. There must be some way of extracting this signal from your camera, and your manual should give details.

The program will work on the Master and when you press S you will see nothing on the screen unless the digitiser is connected and a source of composite video is connected to the board.

Manual confusion

I HAVE (in order of priority) a shelf of *The Micro User*, BBC Micro and an NEC 8023BE-N dot matrix printer.

The NEC handbook refers to the LPRINT statement, this means absolutely nothing to me and even less to the micro. Could you please explain how to send characters to my printer? – **A.M. Knights, Becles, Suffolk.**

● *All the commands that are given as LPRINT send data directly to the printer. The BBC Micro uses a different method – VDU 1,X where X is the byte to send to the printer. Also a VDU 2 turns the printer driver on and VDU 3 turns it off. So if your manual says:*

```
LPRINT CHR$(27);CHR$(14)
```

then you need to write:

```
VDU2,1,27,1,14,3
```

To send text to the printer you just need:

```
VDU2
PRINT"My text"
VDU3
```

Gamer's keyboard

PLEASE could you tell me how to connect a Sirius keyboard to a BBC Micro so it could be used for playing games. Also, the Z and X keys on my micro behave erratically after about 30 minutes of game playing even though I have recently given the keyboard a very good clean. Could you tell me what is wrong? – **Robin Weston, Kibworth, Leicestershire.**

● *It is not possible to connect any other machine's keyboard to the BBC Micro for playing games as most of this type of software looks*

Turn to Page 20 ▶

◄ *From Page 19*

directly at the hardware.

It sounds as though you have given the Z and X keys a bit of a bashing and it could be that the key contacts are intermittent. In this case the cure would be to replace the keys. However a crack might have developed in the PCB tracks near the keys and if so you should scrape back the green solder mask and solder in a wire to bridge the gap.

Misspelling bits

I HAVE a BBC B that is not working properly. The problem is that in Mode 7, when I type in COMPUTER, for example, the screen displays CKIPQPAR. When I type in CHAIN in reads CHAIJ.

The computer understands the instruction and carries it out as normal, but I do not really know what I'm are typing in, as it appears differently on the screen. Sometimes some of the characters start flashing. All the other modes are perfectly all right: It is just Mode 7 that has gone wrong.

Recently I had my operating system upgraded from 0.1 to 1.2. I thought this might be the cause of the problem, but I have eliminated that. Could you please tell me what is wrong with my computer. Is there a chip that I should replace? – **Stephen Clarke. Malvern, Worcs.**

● *If you write down the binary value of the Ascii codes for what you are typing against what you get you will see that it is bit 2 that is not behaving correctly. Here are the values for your example:*

	Bits	Bits	
C	0011	0011	C
O	1111	1011	K
M	1101	1001	I
P	0000	0000	P
U	0101	0001	Q
T	0100	0000	P
E	0101	0001	A
R	0010	0010	R

Mode 7 is handled by a different chip than the other modes and so comes under suspicion. This chip is IC5, the SA5050, which is fed by IC15, a 74LS273. Either chip could be faulty, but a more likely explanation is that a pin is bent underneath and not making contact with the socket.

Remove both ICs and see that they are seating correctly. The likely culprit is pin 7 or 6 on IC15 or pin 6 on IC5.

Faulty cassette interface

THE cassette interface on my BBC Micro failed recently, allowing no input or output. But what is more strange is that the Record then Return message and the block numbers have disappeared – the only thing working is the cassette relay. Escape still aborts saving. Do you think that

THE MICRO USER MAIL ORDER OFFERS THE MICRO USER MAIL ORDER OFFERS

We must be crazy!

ONLY £69.95 for the MicroLink dual speed modem!

(Includes Mini Office comms software.)

After our Autumn stock clearance we have a number of surplus dual speed MicroLink modems which we are offering at the give-away price of just £69.95!

The dual speed modem sports the distinctive MicroLink livery, works at 1200/75 and 300/300 baud and is fully BABT approved.

With it you get a comprehensive user guide, Mini Office comms software, a MicroLink reference booklet, all the leads you need to get up and running, and one months FREE registration to MicroLink!

So, if you've been looking for an easy and inexpensive way to get on line, now is your ideal opportunity to explore the exciting, expanding world of telecommunications!

Please note: Stocks of the dual speed modem are limited and are available strictly on a first come, first served basis. To avoid disappointment, we will only accept telephone orders for this offer. Check for availability, by phoning 0625 879940 between 9am and 5pm only.

MicroLink
DUAL-SPEED
MODEM

SAVE £30

RRP £99.95 CLEARANCE PRICE £69.95

For details of the MicroLink multi-speed modem – see Page 42

TO ORDER PLEASE TELEPHONE 0625 879940

this problem lies in the operating system rather than the cassette interface? – **Simon Adams, Epsom, Surrey.**

● *If the messages have disappeared along with the function of the cassette I would suspect the problem is in the 6850 ACIA – the device that converts between serial and parallel. It looks as if the software is not getting the usual reponse from this chip and is waiting until it does. In effect the micro is hanging at this point and you are never getting into the save routine.*

Micro telepathy

MY school has several BBC Micros and I have written a very simple program that creates random pictures in eight-directional symmetry. When I ran this on seven of the micros simulataneously four drew totally different patterns, but the three in the corner astounded me by coming up with identical pictures – they even grew in the same way.

They are not connected at all, so naturally it gave me a surprise. Does anyone know of any other cases of machine telepathy? – **Mark Edwards, Faulkland, Bath.**

● *I am surprised at your* telepathic *micros: Not that three drew the same picture, but that four drew different ones. You see when you ask for a random number the BBC Micro – like all computers – generates, not a random number, but a pseudo-random one. This means that it is a number in a set sequence but with no recognisable pattern.*

When you first switch the micro on, the seed number is always the same so the sequence of numbers generated is identical. What must have happened with the four micros is that either they have a different version of Basic fitted or they had run a program previously that called on the random number routine.

One good way to seed the random number generator to ensure you get different sequence is to use the command:

```
T=RND(-TIME)
```

at the start of your program. This will ensure that if you have 20 micros running they should all produce a different picture sequence.

Two step

I WOULD like to know if there is a link, or some other component, on my 80 track disc drive which I could adjust to make it double step, and behave like a 40 track drive. Alternatively, is there a software patch I could use to make it double step? – **Allan Brown, Thame, Oxfordshire.**

● *The October 1985 Body Building article shows how to achieve double-stepping with hardware.*

Have you any hardware problems with your BBC Micro? If so, write to Mike Cook, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP, giving full details of your system and the problem.

Unfortunately, Mike cannot send you personal replies, but as many questions as possible will be answered on the pages of The Micro User.

THE MICRO USER **MAIL ORDER OFFERS** THE MICRO USER **MAIL ORDER OFFERS**

It's true!

SAVE £50

RRP £69.95

Our price! £19.95

Yes, that's right, for a limited period we are slashing the price of one of Acornsoft's most powerful products!

Acornsoft Logo is a full implementation of the language widely used in schools throughout the country. And it includes its own special features such as multiple screen turtles, extensive sound and graphics commands, and list processing facilities.

The package includes two roms crammed with code, three manuals – covering everything from first principles to writing sophisticated programs and creating your own extensions to the language, a quick reference card, one disc and one cassette.

Proven to be one of the best ways to introduce newcomers to programming, as well as being extremely versatile and fast enough for the most experienced programmer, and at the incredibly reduced price of £19.95, Acornsoft Logo is a language that should be in everyone's collection!

To order your pack, please turn to the form on Page 135

PROGRAM Library No.21

Compiled by Steve Turnbull

THE problem of program legality comes up from time to time as I go through your entries to the Library. This month's Dancing cursor is a case in point: It directly accesses a hardware memory location – but this method is actually the best way on this occasion.

The routine is interrupt-driven and its load and execution addresses are set up so that it will always run in the I/O processor whatever second processor you may be using. So despite the fact it doesn't use an operating system call, it is permissible as a program for the Library.

Other programs this month are an implementation of the Shell sort, a quick string reversal program and, from one of our more regular contributors, a routine that tells you how much memory you've used – and got left – when programming in Basic.

Title: Dancing cursor
Language: 6502
Author: Sam Dudley

Here's a quickie to brighten up your screen display: Using the screen sync interrupt it continuously re-programs the position of the cursor within the character. The end result is that the cursor keeps moving up and down – in fact it's much easier to spot so would find a use on a complicated form-filling page.

The 6845 CRT chip registers 10 and 11 control which character rows the cursor starts and finishes. So you can alter the overall shape of the cursor by modifying these. The technique can be used for more intricate re-programming so that even more interesting effects can be produced.

```
   10 REM Dancing cursor
   20 REM by Sam Dudley
   30 PROCinit:PROCassem
   40 PROCos("SAVE dance FFFF"+FNhe
x4(code)+" FFFF"+FNhex4(P%))
   50 CALL init:END
   60 DEF PROCinit
   70 evntv =&0220:code  =&0900
   80 reg   =&FE00:val   =&FE01
   90 oswrch=&FFEE:osbyte=&FFF4
  100 oscli =&FFF7:ENDPROC
  110 DEF PROCassem
  120 FOR L%=0 TO 2 STEP 2
  130 P%=code:[OPT L%
  140 .init SEI
  150  LDA evntv+0:STA oldvector+1
  160  LDA evntv+1:STA oldvector+2
  170  LDA #entry MOD256:STA evntv+0
  180  LDA #entry DIV256:STA evntv+1
  190  LDA #0:STA dir:STA pos
  200  CLI:LDA #14:LDX #4:JMP osbyte
  210 .entry
  220  CMP #4:BNE oldvector
  230  PHP:PHA:TXA:PHA:TYA:PHA
  240  BIT dir:BPL cursor_up
  250 .cursor_down
  260  DEC pos:BNE set_cursor
  270  LDA #0:STA dir:BEQ set_cursor
  280 .cursor_up
  290  INC pos:LDA pos
  300  CMP #15:BNE set_cursor
  310  DEC dir
  320 .set_cursor LDX #10
  330  LDY pos:JSR vdu23
  340  INX:INY:JSR vdu23
  350  PLA:TAY:PLA:TAX:PLA:PLP
  360 .oldvector JMP &FFFF
  370 .vdu23 STX reg:STY val:RTS
  380 .dir BRK:.pos BRK
  390 ]:NEXT:ENDPROC
  400 DEF PROCos($&700):LOCAL X%,Y%
  410 Y%=7:CALLoscli:ENDPROC
  420 DEF FNhex4(H%)=RIGHT$("0000"+
STR$~H%,4)
```

Get it right!

```
 10 =    0 0 | 150 = B814 7 | 290 = 8674 1
 20 =    0 0 | 160 = 9895 F | 300 =   4F 9
 30 = 597F F | 170 = B005 B | 310 = 5503 D
 40 = 81CF A | 180 = E04D A | 320 = E1C7 0
 50 = A04B 8 | 190 = 9347 F | 330 = E29D C
 60 = 40D7 D | 200 = 2EFC 8 | 340 = 25CE 9
 70 = 2C81 5 | 210 = F1E5 5 | 350 = 9ADF 3
 80 = 39D4 D | 220 = A731 B | 360 = C0E4 E
 90 = 5C3E 0 | 230 = A5E9 8 | 370 = A6EF 5
100 =  B5E 2 | 240 = 813F D | 380 = 236A D
110 = B623 A | 250 = 5F6C 5 | 390 = 953B C
120 = AAB9 F | 260 = 2D4E 0 | 400 = 61B0 4
130 = 7CBB D | 270 =  2DC E | 410 = FB84 6
140 = 19D6 8 | 280 = 6A28 A | 420 = B6AB C
```

Title: String reversal
Language: Basic
Author: Jeremy Bull

Although this is really a solution in search of a problem it's always an entertaining programming test to see how efficiently it can be done.

Here's a very fast technique – using an absolute minimum of string handling – which will reverse any string at a rate of about .002 seconds per character.

Get it right!

```
 10 REM String Reversal                 |  10 =    0 0
 20 REM by Jeremy Bull                  |  20 =    0 0
 30 DIM b%256                           |  30 = 978A A
 40 REPEAT                              |  40 = BFBA 4
 50 INPUT"Enter the string:"s$          |  50 = 6FF7 6
 60 PRINT FNreverse(s$)                 |  60 =  7FF 3
 70 UNTIL FALSE:END                     |  70 = DADE D
 80 DEF FNreverse($b%)                  |  80 = D539 6
 90 LOCAL C%,K%,L%,T%                   |  90 = A50C B
100 L%=LEN$b%-1:K%=L%                   | 100 = 3791 1
110 FOR C%=0 TO L%DIV2                  | 110 = AA2E A
120 T%=b%?C%:b%?C%=b%?K%                | 120 =  3C8 6
130 b%?K%=T%:K%=K%-1:NEXT:=$b%          | 130 = A0B3 7
```

Title: Memory status display
Language: 6502
Author: Andrew Moulden

If you get tired of printing the values of various memory pointers such as TOP and LOMEM during program development and then doing time-wasting calculations to see how much memory is left, you will find this little utility very useful. Type in the program, run it and the machine code will be saved under the filename STATUS. Typing any of the commands:

```
*STATUS
*/STATUS
CALL &900
```

will execute the machine code, which displays the values of variables like Page and Oshwm and also the length of the current program, free memory and so on.

Get it right!

```
 10 =    0 0 | 210 = B9BC 2 |
 20 =    0 0 | 220 = BB5A 0 |
 30 = 414E E | 230 = DF40 9 | 410 = E5CE B
 40 = 30B4 D | 240 = 1EBC C | 420 = 8504 5
 50 = 437F C | 250 = 7EFA D | 430 =  F6C C
 60 = 2249 D | 260 = 9F9D 4 | 440 = 2165 9
 70 = E847 E | 270 = 58C8 0 | 450 = 2C83 6
 80 =  99C 4 | 280 = CF87 9 | 460 = 89D1 1
 90 = C18C 4 | 290 = 2E9D E | 470 = CD9C 4
100 = 5739 9 | 300 = CC2F 0 | 480 = 75B1 1
110 = 42A3 E | 310 = C3C0 1 | 490 = 69C8 C
120 = BFF2 9 | 320 = C989 B | 500 = 1298 F
130 = 1FC8 E | 330 = 6FB8 0 | 510 = 8D66 3
140 = 84D5 2 | 340 = 7AA8 6 | 520 = FD2E 3
150 = 8B46 2 | 350 = EC6A D | 530 = FF3A E
160 = 1787 8 | 360 = A99B A | 540 = 885A 2
170 = 97B7 9 | 370 = 8E29 9 | 550 = 6F7C A
180 = 2EB5 8 | 380 = 6CCD F | 560 = CF94 4
190 = C8C6 1 | 390 = 3B49 9 | 570 =  98E E
200 = 670D C | 400 = 7684 A | 580 = AEE4 A
```

```
   10 REM Memory Status Display
   20 REM by Andrew Moulden
   30 ptrlo=&F8:ptrhi=&F9
   40 asci=&FFE3:newl=&FFE7:byte=&F
FF4
   50 FOR pass=0 TO 2
   60 P%=&900:[OPT pass AND 2
   70  LDA #text DIV 256:STA ptrhi
   80  LDA #text MOD 256:STA ptrlo
   90  LDY #0:JSR print:LDA 24:JSR
hex
  100  LDA #0:JSR hexp:LDA 19:JSR h
ex
  110  LDA 18:JSR hexp:LDA 1:JSR he
x
  120  LDA 0:JSR hexp:LDA 7:JSR hex
  130  LDA 6:JSR hexp:TYA:PHA
  140  LDA #131:JSR byte:TYA:JSR he
x
  150  PLA:TAY:TXA:JSR hexp
  160  LDA 3:JSR hex:LDA 2:JSR hexp
  170  LDA 2:SEC:SBC 18:PHA
  180  LDA 3:SBC 19:STA wb1:JSR hex
  190  PLA:PHA:JSR bytes
  200  LDA 19:SEC:SBC 24:STA wb3
  210  JSR hex:LDA 18:STA wb2:JSR b
ytes
  220  CLC:PLA:ADC wb2:PHA
  230  LDA wb1:ADC wb3:STA wb0:JSR
hex
  240  PLA:JSR hexp:LDA 6:SEC:SBC 2
:PHA
  250  LDA 7:SBC 3:JSR hex:PLA:JSR
hex
  260  JMP newl
  270 .hex PHA:AND #240:LSR A:ROR
A
  280  ROR A:ROR A:JSR dig:PLA:AND
#15
  290 .dig CLC:ADC #48:CMP #58
  300  BCC pdigit:CLC:ADC #7
  310 .pdigit JMP asci
  320 .bytes JSR hex:LDX #255
  330 .loop INX:LDA t2,X:JSR asci
  340  BNE loop:BEQ print
  350 .hexp JSR hex
  360 .print LDA (ptrlo),Y:PHP:JSR
asci
  370  INY:PLP:BNE print:LDX #255
  380 .loop INX:LDA t3,X:JSR asci
  390  BNE loop:RTS:.wb0 BRK
  400 .wb1 BRK:.wb2 BRK:.wb3 BRK
  410 ]:text=P%:RESTORE
  420 FOR i=0 TO 9:READ i$
  430 IF i MOD 2=0 OR i>5 i$=CHR$13
+i$
  440 $P%=i$+CHR$0:P%=P%+LEN($(P%+1
))+1
  450 NEXT
  460 t2=P%:$P%=" bytes"+CHR$0:P%=P
%+7
  470 t3=P%:$P%=" = &"+CHR$0:P%=P%+
5
  480 NEXT:PRINT"Saving..."
  490 *SAVE $.STATUS 900 A69
  500 VDU11,7:PRINT"Saved... ";
  510 PRINT"Type */STATUS to execut
e."
  520 END
  530 DATA PAGE ,"  TOP   ",LOMEM
  540 DATA "  HIMEM ",OSHWM,"  VART
OP"
  550 DATA Variable space
  560 DATA Program length
  570 DATA Total bytes used
  580 DATA Total bytes free
```

Title: Shell sort
Language: Basic
Author: Phil Bender

One of the most common methods of sorting a list of numbers or strings into order is the Bubble sort, but it's very inefficient and the time taken for it to work increases exponentially as the number of items goes up. A much more efficient method is the Shell sort which will order 100 random integers in about six seconds.

It works by dividing the set in half and swapping items that are out of order between the halves. The halves are then divided and swaps made between these and so on until the gap between the swaps is reduced to one. At which point the items are in order.

The time taken in a Shell sort increases by a factor of about three for each doubling in the number of items – much better than the Bubble sort.

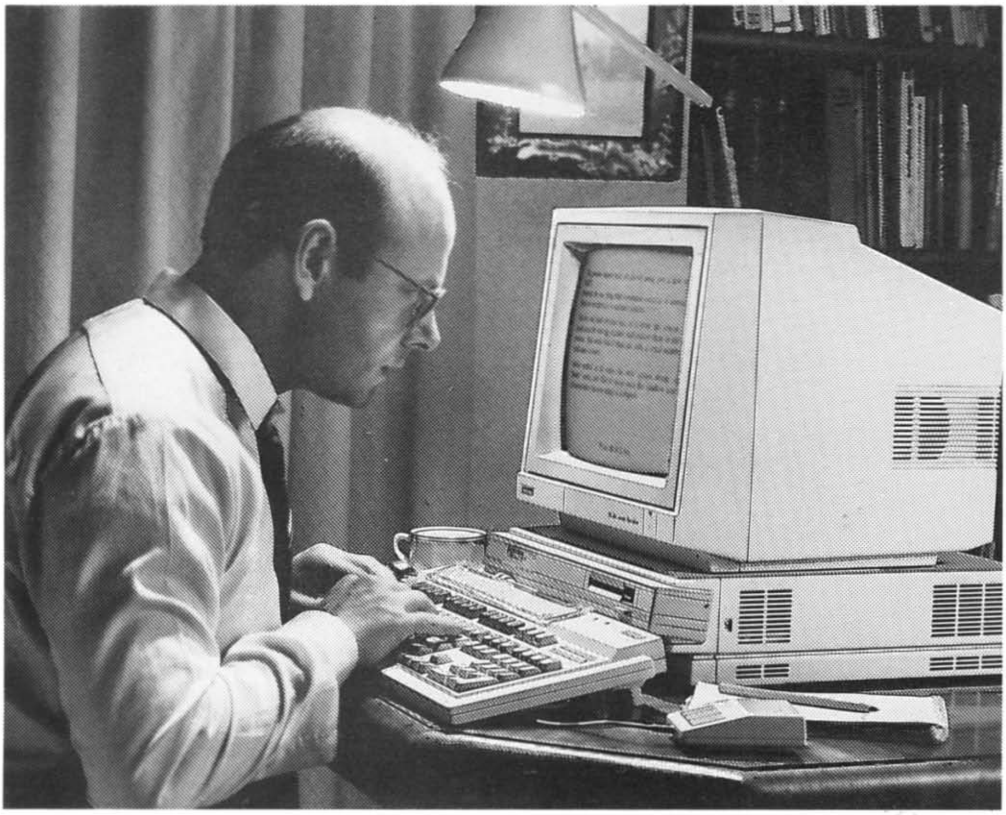
Get it right!

```
10 =    0 0 |  90 = 7A34 F | 170 = 87F9 2
20 =    0 0 | 100 = 7E36 9 | 180 = 4078 6
30 = F056 6 | 110 = A838 5 | 190 = BCA0 4
40 = 1EB4 9 | 120 = C4EF F | 200 =  10F 6
50 = 5C29 3 | 130 = 5E2C B | 210 = 17B1 9
60 = 9EBC 9 | 140 = 6F90 C | 220 = ED0F 6
70 = 173E 4 | 150 = 929E D |
80 = A64F D | 160 =  727 5 |
```

```
   10 REM Shell sort
   20 REM by Phil Bender
   30 INPUT"Number of items ",items%
   40 DIM A%(items%)
   50 FOR J%=1 TO items%:A%(J%)=RND
:NEXT
   60 SOUND&11,-8,220,1
   70 TIME=0
   80 PROCshell
   90 PRINTTIME/100
  100 RUN
  110 DEF PROCshell
  120 LOCAL G%,J%,K%,T%,gap%
  130 gap%=1
  140 REPEAT gap%=gap%+gap%
  150 UNTIL gap%>items%:gap%=gap%-1
  160 REPEAT gap%=gap%DIV2
  170 FOR K%=1 TO items%-gap%:J%=K%
  180 REPEAT G%=J%+gap%
  190 IF A%(J%)>A%(G%) T%=A%(J%):A%
(J%)=A%(G%):A%(G%)=T% ELSE J%=1
  200 J%=J%-1:UNTIL J%=0
  210 NEXT:UNTIL gap%=1
  220 ENDPROC
```

JOURNALIS

(What other micro has



Whether you are producing a social club newsletter or writing your life story, the Archimedes system is simplicity itself to use, producing a crispness and clarity of image second to none.

Whether you are an enthusiastic beginner or the most experienced musician, the ability of the Archimedes system combined with the appropriate software offers you a superb music work station. Add a MIDI (Musical Instrument Digital Interface) instrument and you enter a world of unlimited music control.

M OR JAZZ

the power to do both?)

Using Acorn's extremely powerful RISC chip, the Archimedes High Performance computer system is probably the most versatile of any microcomputer.

One of the first things that will impress you is how easy it is to use.

You'll be up and running almost immediately.

Virtually all the applications software you are ever likely to need is available to exploit the speed and power of this remarkable computer.

As a further demonstration of versatility, the Archimedes system, with its optional PC emulator, can run a vast range of MS-DOS software.

It's the perfect solution for practical disciplined work or for flexing your creative muscles.

Archimedes

Tel: 0800 678 888 (Free call anytime).

To: Acorn Computers Limited, FREEPOST (TK960)
Brentford, Middlesex TW8 8BR.
Please send me the Archimedes power pack with relevant information on applications packages.
I indicate below my particular area of interest.

☐ Business application ☐ Healthcare ☐ Education ☐ Home use
☐ General interest ☐ Other? (please specify)

Name____________________

Company/school/establishment:____________
(if applicable)

Address____________________

Postcode__________

Tel no.__________

MU1J

Acorn
The choice of experience.

Acorn and Archimedes are trademarks of Acorn Computers Limited.
MS-DOS is a trade mark of Microsoft Corporation.

Get ahead – get a logo

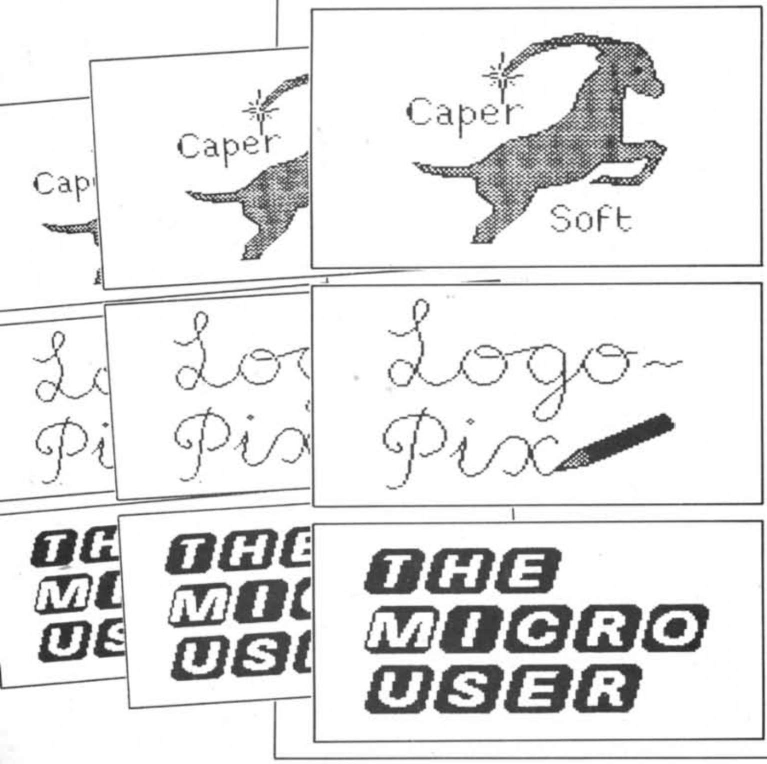
Bruce Goatly helps you draw a design which will improve your image

LAST month Peter Davidson showed you a quick way to use the FontStyle package to design your own letterhead. But a picture is worth a thousand words, so for the more ambitious here's a simple program to let you produce a logo to enhance your image. You can then print it directly, or as part of a FontStyle document.

First type in the listing, check it with Get it Right! and save it. When you run it you'll see a large rectangle occupying most of the screen, with flashing crosshairs in the bottom left corner. This is your graphics cursor, which is moved with these keys:

Z	Left
X	Right
*	Up
?	Down

Pressing Return prints a white point on the screen at the cursor position, while Delete prints a black point – which is the same as removing a white one. Remember that white on the screen will print out black. Straight vertical, horizontal and diagonal lines can be drawn by holding down Return or Delete with combinations of the direction keys.



For other straight lines you can use the Draw option: Press D and choose the colour you require for the line – if you press Delete – for black – you can rub out an unwanted line. Then move the cursor to where you want the line to finish and press D again to draw the line.

To fill an area with a solid colour press F, then Return to fill a black area with white or Delete to fill a white area with black. Pressing H instead of F puts hatching in the area to give a stippled effect. The choice of white or black does not affect the pattern but should be the same as the boundary colour, as with the Fill option.

Because of the way the program works, you may need to use Fill or Hatch several times for oddly-shaped areas. You can stop a filling process by pressing Escape.

To save a design as a screen image press S and entering a filename or load one by pressing L. If you have not saved the current screen you will be asked for confirmation before loading another.

To clear the design area press C, which first checks that you mean it and then, if the screen has not been saved, that you really mean it.

You can get a hardcopy of the design on an Epson-compatible printer capable of double-density graphics by pressing P. The data is read from the screen, converted suitably and sent to the printer as 12 lines of graphics. This takes a couple of minutes because of the calculations involved.

As it is set up, the program will print the design at the left edge of the paper. You can change this

MAIN VARIABLES

X%,Y%	Coordinates of crosshairs
cr%	Cursor currently plotted flag
exit%	Leaving program flag
safe%	Currently loaded screen un-edited flag
buf	Buffer to hold star commands
t	Time delay
F$	File name

with the Indent option, selected by pressing I and entering a number, in tenths of an inch, to move the design to the right. The maximum indent allowed is 56.

To store the design in a form in which it can be quickly printed out by FontStyle, press @ and give a filename. The graphics data will be spooled to tape or disc instead of being sent to the printer. Any indent you have set will be included in the data.

When you want to leave the program, press Q: You will be warned if the design has not been saved and given a last chance to save it. For added security, users of versions of the BBC Micro that clear to Mode 7 on pressing Break – unfortunately not the Master or the Compact – can make use of the message programmed into function key 10, which tells you that the screen data can still be saved after an accidental Break.

The most effective way to use your design is from within FontStyle, using the GF command, which takes a graphics file from disc and sends it straight to the printer without processing it. So, to print a logo at the top left of your letterhead and your address at the top right, use GF LOGO followed by PA to pause printing while you wind back the paper. Then restart printing to put the address alongside your stunning new logo.

ROUTINES	
c	Draw the crosshairs
clear	Wipe all data from the screen
data	Output the screen data to currently selected channel
error	Tidy up when an error has occurred
fill	Perform a fill either solid or hatched
finish	Tidy up prior to exiting program
getkey	Scan the keyboard for a key press and call appropriate routine
indent	Set up the logo indent from left hand side
init	Initialise the program variables
line	Draw a line on the screen
load	Get a logo screen from disc
movecurs	Move the cursor on screen
oscli	Perform a star command
pr	Print text in various colours and formats
print	Output hard copy of the logo
quit	Exit the LogoPix program
save	Backup screen to disc
setscr	Draw the main screen
spool	Output disc copy of the logo
spot	Place a black or white blob on the screen
v	Output a byte of data, exclusively to printer if selected
wait	Delay for a given amount of time
check	Make sure he really means it
getcol	Find out which colour to use
in	Input a string

```
   10 REM LogoPix
   20 REM by Bruce Goatly
   30 REM (c) The Micro User
   40 MODE4
   50 PROCsetscr
   60 PROCinit
   70 ON ERROR PROCerror
   80 PROCc
   90 REPEAT
  100 PROCgetkey
  110 UNTILexit%
  120 PROCfinish
  130 END
  140 DEFPROCsetscr:GCOL 0,1
  150 MOVE60,156:DRAW1216,156
  160 DRAW1216,960:DRAW60,960:DRAW60,156
  170 VDU&FF17;&55AA;&55AA;&55AA;&55AA;
  180 VDU5:MOVE530,996:PRINT"LogoPix"
  190 GCOL2,0:MOVE530,996
  200 PRINTSTRING$(7,CHR$255)
  210 VDU4,23,1,0;0;0;0;
  220 PROCpr(6,2,28,"Return white"):PROC
pr(6,15,28,"Delete black")
  230 PROCpr(1,29,28,"Draw"):PROCpr(1,34
,28,"Quit")
  240 PROCpr(1,2,29,"Fill"):PROCpr(1,8,2
9,"Hatch")
  250 PROCpr(1,15,29,"Clear"):PROCpr(1,2
2,29,"Indent 00")
  260 PROCpr(1,33,29,"Print"):PROCpr(1,2
,30,"Load")
  270 PROCpr(1,8,30,"Save"):PROCpr(1,14,
30,"@ Spool")
  280 ENDPROC
  290 DEFPROCinit:in%=0:*FX4,1
  300 VDU29,80;176;:X%=0:Y%=0
  310 safe%=TRUE:*FX213,180
  320 exit%=FALSE:*FX214,2
  330 REM The next line won't work on a
Master or Compact
  340 *KEY10PRINTCHR$12''"Type  *SAVE <f
ilename> 5A80 79C0''"to save logo"|M
  350 DIM buf&100:ENDPROC
  360 DEFPROCgetkey:PROCc
  370 IFINKEY-51 PROCline:ENDPROC
  380 IFINKEY-98ORINKEY-67ORINKEY-73ORIN
KEY-105 PROCmovecurs
  390 IFINKEY-74 PROCspot(1,X%,Y%)
  400 IFINKEY-90 PROCspot(0,X%,Y%)
  410 IFINKEY-68 PROCfill(0)
  420 IFINKEY-85 PROCfill(1)
  430 IFINKEY-83 PROCclear
  440 IFINKEY-38 PROCindent
  450 IFINKEY-17 PROCquit
  460 IFINKEY-82 PROCsave
  470 IFINKEY-87 PROCload
  480 IFINKEY-56 PROCprint
  490 IFINKEY-72 PROCspool
  500 PROCc:PROCwait(.1):ENDPROC
  510 DEFPROCmovecurs
  520 LOCAL I%:I%=8:IF INKEY-1 I%=32
  530 IFINKEY-98:X%=X%-I%:IFX%<0X%=X%+11
20
  540 IFINKEY-67X%=(X%+I%)MOD1120
  550 IFINKEY-73Y%=(Y%+I%)MOD768
  560 IFINKEY-105Y%=Y%-I%:IFY%<0Y%=Y%+76
8
  570 ENDPROC
  580 DEFPROCwait(t):t=TIME+t*100
  590 REPEAT UNTIL TIME>t:ENDPROC
  600 DEFPROCc:GCOL3,1:cr%=NOTcr%
  610 MOVEX%-12,Y%:PLOT1,24,0
  620 MOVEX%,Y%-12:PLOT1,0,24:ENDPROC
  630 DEFPROCspot(c%,x%,y%):GCOL0,c%
  640 PLOT69,x%,y%:PLOT65,4,0
  650 PLOT65,0,4:PLOT65,-4,0
  660 safe%=FALSE:ENDPROC
  670 DEFFNcheck(m$)
  680 COLOUR0:COLOUR129:VDU7
  690 PRINTTAB(23,30)m$": OK?";
  700 REPEATA%=INSTR("YyNn",GET$)
```

Turn to Page 28 ▶

A picture is worth a thousand words

◄ From Page 27

```
  710 UNTILA%>0:COLOUR1:COLOUR128
  720 VDU7:PRINTTAB(23,30)SPC17;:=A%<3
  730 DEFPROCdata:LOCALB%,C%,R%,S%,Y%
  740 PROCv(27):PROCv(65):PROCv(8)
  750 FORR%=11TO0STEP-1
  760 IFin%FORS%=1TOin%:PROCv(32):NEXT
  770 PROCv(27):PROCv(76):PROCv(24):PROC
v(1)
  780 FORC%=0TO139:Y%=0:J%=1:FORB%=0TO7
  790 Y%=Y%+(J%*POINT(8*C%,64*R%+8*B%))
  800 J%=J%+J%:NEXT
  810 PROCv(Y%):PROCv(Y%):NEXT
  820 PROCv(10):NEXT
  830 PROCv(27):PROCv(65):PROCv(12)
  840 ENDPROC
  850 DEFPROCv(B%):IFP%VDU1
  860 VDUB%:ENDPROC
  870 DEFPROCline
  880 REPEATUNTILNOTINKEY-51:*FX21
  890 col%=FNgetcol
  900 COLOUR0:COLOUR129:VDU7
  910 PRINTTAB(23,30)"Draw to...?";
  920 ox%=X%:oy%=Y%
  930 REPEATPROCc:PROCmovecurs:PROCc:PRO
Cwait(.1):UNTILINKEY-51
  940 COLOUR1:COLOUR128:VDU7:*FX21
  950 PRINTTAB(23,30)SPC15;
  960 GCOL0,col%:MOVEox%,oy%:DRAWX%,Y%
  970 MOVEX%+4,Y%:DRAWox%+4,oy%
  980 MOVEox%+4,oy%+4:DRAWX%+4,Y%+4
  990 MOVEX%,Y%+4:DRAWox%,oy%+4
 1000 REPEATUNTILNOTINKEY-51:*FX21
 1010 safe%=FALSE:ENDPROC
 1020 DEFPROCindent
 1030 oldin%=in%:in%=VALFNin("",2,29,29)
 1040 IFin%>56 in%=oldin%
 1050 PRINTTAB(29,29)LEFT$("00",2-LENSTR
$in%)STR$in%
 1060 REPEATUNTILNOTINKEY-74:*FX21
 1070 ENDPROC
 1080 DEFPROCclear
 1090 IFFNcheck("Clear")VDU24,0;0;1120;7
68;16:safe%=TRUE
 1100 ENDPROC
 1110 DEFPROCquit
 1120 IFFNcheck("Quit")exit%=TRUE:IFNOTs
afe%IFNOTFNcheck("Data unsaved")PROCsave
 1130 ENDPROC
 1140 DEFPROCfinish:*FX4
 1150 PROCoscli("FX6,10"):*FX21
 1160 PROCoscli("FX213,101"):*KEY10
 1170 VDU23,1,1;0;0;0;26,12:*FX214,7
 1180 PROCc:ENDPROC
 1190 DEFPROCprint:P%=TRUE
 1200 COLOUR0:COLOUR129
 1210 PRINTTAB(23,30)"Printing...";
 1220 VDU7,2:PROCdata:VDU3,7
 1230 COLOUR1:COLOUR128
 1240 PRINTTAB(23,30)SPC15;:ENDPROC
 1250 DEFPROCspool
 1260 F$=FNin("Filename:",7,23,30)
 1270 P%=FALSE:VDU7:COLOUR0:COLOUR129
 1280 PRINTTAB(23,30)"Spooling...";
 1290 COLOUR1:COLOUR128:VDU28,0,31,39,31
 1300 *FX3,2
 1310 PROCoscli("SPOOL "+F$):PROCdata
 1320 PROCoscli("SPOOL"):*FX3
 1330 CLS:VDU26,29,80;176;
 1340 VDU7:PRINTTAB(23,30)SPC15;
 1350 ENDPROC
 1360 DEFPROCfill(M%):LOCAL C%,I%,V%
 1370 I%=8:V%=8:C%=FNgetcol
 1380 bord%=C%:x%=X%:y%=Y%
 1390 REPEAT:REPEAT:REPEAT
 1400 x1%=X%:y1%=Y%
 1410 IF M% C%=-(X%MOD16=Y%MOD16)
 1420 REPEAT
 1430 PROCspot(C%,x1%,y1%)
 1440 C%=C%EORM%:x1%=x1%+I%
 1450 UNTILPOINT(x1%,y1%)=bord% OR x1%<0
OR x1%>1112
 1460 I%=-I%:UNTIL I%>0
 1470 Y%=Y%+V%
 1480 UNTILPOINT(X%,Y%)=bord% OR Y%<0 OR
Y%>760
 1490 IFy%>0X%=x%:Y%=y%-8:V%=-V%
 1500 UNTILV%>0:X%=x%:Y%=y%
 1510 safe%=FALSE:ENDPROC
 1520 DEFPROCpr(rev%,x%,y%,p$)
 1530 COLOUR0:COLOUR129:PRINTTAB(x%,y%)L
EFT$(p$,rev%);
 1540 COLOUR1:COLOUR128:PRINTRIGHT$(p$,L
ENp$-rev%);
 1550 ENDPROC
 1560 DEFPROCsave
 1570 F$=FNin("Filename:",7,23,30)
 1580 VDU28,0,31,39,31
 1590 PROCoscli("SAVE "+F$+" 5A80 79C0")
 1600 CLS:VDU26,29,80;176;
 1610 safe%=TRUE:ENDPROC
 1620 DEFPROCload
 1630 IFNOTsafe%IFNOTFNcheck("Load data"
)ENDPROC
 1640 F$=FNin("Filename:",7,23,30)
 1650 VDU28,0,31,39,31
 1660 PROCoscli("LOAD "+F$+" 5A80")
 1670 CLS:VDU26,29,80;176;
 1680 safe%=TRUE:ENDPROC
 1690 DEFPROCoscli($buf):LOCALX%,Y%
 1700 X%=buf:Y%=X%DIV256:CALL&FFF7
 1710 ENDPROC
 1720 DEFFNin(m$,L%,x%,y%)
 1730 PRINTTAB(x%,y%)m$STRING$(L%,CHR$25
5);
 1740 R$="":PRINTTAB(x%+LENm$,y%)R$;
 1750 VDU23,1,1;0;0;0;:*FX21
 1760 REPEAT REPEAT A%=GET
 1770 UNTIL(A%>31 AND A%<128)OR A%=13
 1780 IFR$>""IFA%=127VDUA%,255,8:R$=LEFT
$(R$,LENR$-1)
 1790 IFA%<>127IFA%<>13IFLENR$<L% R$=R$+
CHR$A%:VDUA%
 1800 UNTILA%=13:VDU23,1,0;0;0;0;
 1810 PRINTTAB(x%,y%)SPC(LENm$+L%);
 1820 =R$
 1830 DEFFNgetcol:COLOUR0:COLOUR129
 1840 VDU7:PRINTTAB(23,30)"Colour? (Ret/
Del)";:*FX21
 1850 REPEATR%=GET:UNTILR%=13ORR%=127
 1860 COLOUR1:COLOUR128:PRINTTAB(23,30)S
PC17;
 1870 IFR%=13col%=1:PRINTTAB(33,30)"Whit
e";ELSEcol%=0:PRINTTAB(33,30)"Black";
 1880 PRINTSPC12;:Z%=INKEY100
 1890 PRINTTAB(33,30)SPC5:=col%
 1900 DEFPROCerror:CLOSE#0:*FX3
 1910 VDU3,7,23,1,0;0;0;0;:*FX5,1
 1920 COLOUR1:COLOUR128
 1930 PRINTTAB(23,30)SPC17;:IFcr%PROCc
 1940 IF ERR=17 ENDPROC
 1950 VDU28,23,31,39,30:COLOUR0
 1960 COLOUR127:REPORT:Z%=INKEY100
 1970 COLOUR1:COLOUR128:CLS
 1980 VDU26,29,80;176;:ENDPROC
```

Get it right!

```
                              630 = 6607 C   970 = 680B F  1310 = 9B6E 0  1650 = 86FA 0
                              640 = C6FA E   980 = A3CF 2  1320 = 8595 E  1660 = 4EC8 E
                              650 = 39E4 9   990 = A234 1  1330 = 3F53 1  1670 = 3F53 3
 10 =    0 0  320 =  8AD 2    660 = 9FC3 2  1000 = DBDF 3  1340 = E411 8  1680 = 1B61 2
 20 =    0 0  330 =    0 2    670 = 3F75 1  1010 = 9FC3 C  1350 = ED0F C  1690 = B8B1 6
 30 =    0 0  340 = 7D9A C    680 = 3EA7 5  1020 = 1BFA 4  1360 = CECB D  1700 = B38A 0
 40 = BA9F F  350 = D6B1 1    690 = C7B4 B  1030 = 804F B  1370 = 94AB 0  1710 = ED0F 1
 50 = F7FC 1  360 = A3E3 B    700 =  ADF 4  1040 = E679 B  1380 = 7A9B 8  1720 = B58F A
 60 = DEBB 1  370 = 6B15 D    710 = 3604 9  1050 =  F38 2  1390 =  505 1  1730 = B7C7 B
 70 = 9621 9  380 = DED4 1    720 = 1BF8 6  1060 = 2DDE 8  1400 = ED14 E  1740 = EE33 0
 80 = 2966 B  390 = 4EDC 3    730 = 47B4 7  1070 = ED0F 5  1410 = 9923 0  1750 = 6DE7 8
 90 = BFBA 1  400 = 6C81 D    740 = 8459 E  1080 = 4623 B  1420 = BFBA B  1760 = 5254 4
100 = 1AD6 C  410 = 6FDD F    750 = A878 1  1090 = 7D70 A  1430 = 2F4E 7  1770 =  FB2 E
110 = 9762 F  420 = 87AD 7    760 = E57F 5  1100 = ED0F 2  1440 = 8B8C 0  1780 = BC6B 5
120 = 62F4 E  430 = A2FD A    770 = C305 C  1110 = 19BA B  1450 = 2EA6 F  1790 = 5F4E 2
130 = FD2E 5  440 = 876F E    780 = 4208 9  1120 = 1EF1 B  1460 = 2256 7  1800 = 43BE 8
140 = F20C 7  450 = 9E72 5    790 = B1C4 B  1130 = ED0F 1  1470 = 745F C  1810 = 90D9 1
150 =  D50 F  460 = DD4A 7    800 = 376F 6  1140 = F1DA 8  1480 = 44E3 9  1820 = 8BCF 0
160 = 1250 2  470 = FA60 A    810 = 5C44 F  1150 = 92C4 B  1490 = 2C8E D  1830 = 13A7 1
170 = E3F0 9  480 = E29C 9    820 = 8BF9 E  1160 = F540 C  1500 = F878 6  1840 = E215 F
180 = 4F40 E  490 = 3A84 6    830 = 7C5F B  1170 = F243 3  1510 = 9FC3 A  1850 = 798A A
190 = 9B2D B  500 = 4479 6    840 = ED0F 6  1180 = B74F 7  1520 = 7061 F  1860 = EB7C 8
200 = 2AEF 3  510 = 996D 3    850 = 877C 1  1190 = 7466 8  1530 = F673 5  1870 = 9C70 8
210 = 1C7D 1  520 = 9C20 B    860 = B766 D  1200 = B631 2  1540 = 2F11 3  1880 = 1E4D E
220 =  84D E  530 = 7887 3    870 = 961E C  1210 = 6BDB B  1550 = ED0F E  1890 = 2DB9 E
230 = F769 A  540 = 946F E    880 = DBDF 4  1220 = 8113 3  1560 = 7A2C 2  1900 = 95CF B
240 =  16A 3  550 = 1ABA 3    890 = EA98 3  1230 = E3B0 5  1570 = EEAA C  1910 = 8104 5
250 = D277 4  560 = 735E 7    900 = 3EA7 1  1240 = 2C04 3  1580 = 86FA 6  1920 = E3B0 6
260 = 6C27 A  570 = ED0F 5    910 = 7E0C D  1250 =  1DD 5  1590 = C02A C  1930 = 1EAB 5
270 = E43C D  580 = CE48 8    920 = 7015 E  1260 = EEAA 3  1600 = 3F53 3  1940 =  E65 9
280 = ED0F 6  590 = E9A6 8    930 = D9F9 8  1270 = EE8E 9  1610 = 1B61 5  1950 = 3F50 8
290 =  735 2  600 = E74A E    940 = 3F5D D  1280 = 4624 D  1620 = 24A1 E  1960 = 588D C
300 = FCE9 8  610 = 4118 1    950 = C9B2 C  1290 = 3394 9  1630 = C798 C  1970 = 7272 2
310 = A193 7  620 = 5DB9 8    960 = 6691 9  1300 = 5670 7  1640 = EEAA 9  1980 = E3D9 A
```

HARDWARE, SOFTWARE & PERIPHERALS AT DISCOUNT PRICES

	Offer Price inc VAT
Acorn Master 128k	£400.00
Master 512k Upgrade	£215.00
PACE	
400k DS 40/80 switching Disc Drive (no PSU)	£140.00
CUMANA	
400k DS 40/80 switching Disc Drive (no PSU)	£140.00
AKHTER	
Master Compact	£368.00
Master Compact + TV Modulator	£382.00
Master Compact + Mono Monitor	£415.00
Master Compact + Colour Monitor	£570.00
ARCHIMEDES	
A305 Base	£699.00
A305 + Mono Monitor	£770.00
A305 + Colour Monitor	£930.00
A310 Base	£845.00
A310 + Mono Monitor	£905.00
A310 + Colour Monitor	£1,060.00
A310M Base	£905.00
A310M + Mono Monitor	£965.00
A310M + Colour Monitor	£1,125.00

NEW NEW NEW NEW NEW

BT FAX MACHINE (group 3 auto reception)
RSP £995 + VAT OUR PRICE £895 + VAT

CANON FAX 110 (group 2/3 auto plus telephone)
RSP £1499 + VAT OUR PRICE £1195 + VAT
(Free installation plus 1 year warranty on site with Canon 110)

ALL PRICES INCLUDE VAT FREE POSTAGE

Send cheques to: **WILLOW SOFTWARE**
Mail Order Dept (MU 11)
The Willows, Wrington Lane, Congresbury, Bristol BS19 5BQ
Tel.: (0934) 876031 (2 lines & Ansaphone out of hours)
Offers available for a limited period & subject to availability.
Phone for best price–we always try to give you the best deal

COMPUTER MUSIC

Great new products from Acorn's
music consultants

ARCHIMEDES
Arpeggio Music System

STUDIO 24 PLUS A complete recording studio for MIDI instruments and Arc internal sounds, available in expandable software versions on disk to unlimited tracks and MIDI channels, SMPTE timecode, digitised pictures and comprehensive range of realtime and steptime editing. Version 1.0 now available, suitable for home, school and studio use. Send for details. Price £99

ARC MIDI INTERFACES EMR produce a range of interfaces for use with EMR programs using MIDI instruments, including MIDI (up to 4xMIDI in/out for 64 discrete channels, MINI Network to 8032 channels and SMPTE). EMR BBC Midi Interface also suitable when connected to I/O podule. Prices from £79.90

SOUNDSYNTH Lets you create some of the most exciting and complex sounds ever produced by a micro. A Waveform Filing System is provided to allow up to 32 sounds in memory at once. Designed for stand-alone use with your own BASIC, m/c programs, Arc Music Editor or as part of the ARPEGGIO system for using internal sounds with MIDI instruments. Add the Armadillo Sampler Podule and SOUNDSYNTH provides complete control of your own sound samples. Price £49.95

CREATIONS Disks. Super sounds for use with SOUNDSYNTH. Each disk contains a selection of 8 and 16 bit sound sample data, covering musical instruments, percussion and effects. Price £19.95 each.

HANDIMUSIC Composing programs for special needs from £19.95 (Also on BBC).

BBC MICRO

New BBC programs include Performer to Scorewriter link for writing out your played music, Picture Music for age 8-11, Singad for pitch training and assessment, Midi Drummer – a fast pattern maker that links to Performer, Roland MT-32 complete voice + disc storage editor, and a superb real time/step time 16 track Pro-Performer on Rom.

Write or phone for full information on EMR Products, let us quote for a complete system with instruments or answer your questions on computer Midi.
Come and see us at the BBC Micro User Show, London on November 11-13.

EMR LTD., 14 Mount Close, Wickford, Essex SS11 8HG.
Telephone: 0702 335747. Fax: 0702 430405
ACCESS & VISA orders accepted. All prices inc VAT. Add £2 p&p

ELECTROMUSIC RESEARCH (EMR) LTD., 14 MOUNT CLOSE,
WICKFORD, ESSEX SS11 8HG. Telephone: 0702 335747 (24-hr)

SUPER DEALS FROM DELTA

BBC Master 128 + Cumana 40/80 Track Disc Drive	£659.00
BBC Master 128 + Cumana 40/80 Track Disc Drive + National Panasonic 1081 Printer	£818.00
Or Citizen 120D Printer	£809.00
Archimedes 310 Colour System	£1093.00
Archimedes 310 Colour System + National Panasonic 1081 Printer	£1250.00
Or Citizen 120D Printer	£1229.00
Available for the Archimedes offers only:	
PC Emulator Software	Add £62.25
20 Megabyte Hard Disc + Controller	Add £512.00
New' CITIZEN 180E Printer 175cps, 30 NLQ	£189.00

BBC MASTER SERIES

Archimedes	Ring for price
Master 128	£395.00
Master Compact Entry System	£349.00
Master Compact Colour System	£555.00

DISC DRIVES

400K DS/DD 40/80T	£104.95
Dual 800K 40/80T	£204.95
400K + PSU	£129.95
Acorn 1770 Disc Int	£49.00
8271 Disc Interface	£75.00

PRINTERS

Citizen 120D	£159.00
LC10	£217.90
LC10 Colour	£292.15
Panasonic KX-P1081	£169.00

Amstrad DMP 3160	£179.00
Amstrad DMP 3250 DI	£199.10

PRINTER RIBBONS

Brother M1009	£3.25	Citizen 120D/LSP10	£4.60
Brother HR5	£3.25	Citizen MSP 10,20	£2.70
Canon PC 1080A	£3.25	Citizen MSP 15,25	£3.25
Epson FX,MX,RX80	£2.70	Kaga 810	£3.25
Epson LX80, LX86	£2.70	M. Tally MT80	£3.50
Epson FX, MX, RX100	£3.25	Seikosha GP 100/250	£2.65
Panasonic KX -P1081	£3.99	Shinwa CP80	£3.50

SPECIAL OFFERS

Acorn Med. Col. Monitor	£239
Philips 8833 Col. Monitor	£259
Acorn Cassette Player	£19.99

" A VU-File and VU-Calc with every Master purchased."
All orders over £100 receive free Touchpad
for BBC B (only) (while stocks last)
Minimum order £10. Acorn spares always in stock.
Ring for prices

All prices include VAT
Please add £3.50 for orders under £100, £5 carriage on orders over £100. Mail Order only at this address.
Trade and Educational enquiries welcome.

85 Union Street, Oldham Lancs. Tel: 061-626 3841

CARE ELECTRONICS

800 St. Albans Road, Garston, Watford,
Herts. WD2 6NL. Tel: 0923 672102

For your convenience first price Ex VAT, Second Inc VAT

CARE MASTER SMART CARTRIDGE

At the press of a button halt any program running and execute any one of a host of useful built in, or user defined functions and once completed will return to the program and continue. Built in functions include:- Tape to Disc, Screen Dump to Disc or Printer, Sound On/Off, Autosave and much more £30.00 £34.50c

CARE 32K BATTERY BACKED RAM CARTRIDGE

For use as a 32K Sideways Ram or Plug Spellmaster in and have User Dictionary 16K (Battery Backed) all on the same cartridge. With Write Protect Switch and a battery life of approx 10 years £33.00 £37.95c

CARE MASTER ROM CARTRIDGES

ALSO SUITABLE FOR INTERWORD & SPELL MASTER

Standard Cart takes two Roms	£9.00	£10.35c
Standard Cart with Single Zif	£13.40	£15.41c
Standard Cart with Two Zifs	£17.60	£20.24c
Quad Cart takes Four Roms	£14.00	£16.10c
Cartridge for Two 32K Roms	£12.00	£13.80c
Master Rom Extender for using BBC B Cartridges on the Master–Ideal for schools	£12.00	£13.80c
Morley AA (Internal) Rom Board	£40.00	£46.00d

BBC B ROM CARTRIDGE SYSTEM

BBC B Low Profile Rom System	£12.00	£13.80c
BBC B Spare Cartridges	£3.00	£3.45c

BBC B Cartridges can be used on the Master with the Master Rom Extender–See above

EPROM PROGRAMMER V2

Programs 8K, 16K, 32K CMOS or NMOS devices voltage selectable 21V or 12.5V. Complete with comprehensive software which includes Rom management system, plugs into the user port £30.00 £34.50d

SPECIAL OFFER

MORLEY TELETEXT ADAPTOR

Comes with 16K ATS Rom, 16K Utilities Rom, Two Manuals and utilities Disc at the unbeatable price of £84.80 £97.52d

LABELMASTER

Uses a variety of print styles and sizes. All formatting is done for you and can accept different label sizes. A comprehensive label printing program that is easy to use for BBC B, Master, Compact and Electron–Please state model when ordering £15.00 £17.25c

CARE PRINTER BUFFER

User definable for BBC B, Master on Rom or Disc . £13.00 £14.95c

MASTERCOPY

If you need to copy between DFS and ADFS and DFS. MCOPY is it.

Disc Version	£11.26	£12.95c
Rom Version	£13.00	£14.95c

PRINTER SWITCHERS

Two Printers to one computer	£31.00	£35.65d
Four computers to one printer	£50.00	£57.50d

Please note that the above units switch all lines, are suitable for all types of printers and computers using Centronics Parallel and INCLUDE LEAD

Six computers to one printer	£71.00	£81.65d
Four to one automatic switcher	£102.00	£117.30d
Eight to one automatic switcher	£128.00	£147.20d

For advice or a quote on your installation please phone

User port switcher 2 to 1 & off	£33.00	£37.95d
User port switcher 6 to 1 & off	£72.00	£82.80d
RS423 Serial Switcher 2 to 1	£20.20	£23.23d

CARE READY MADE LEADS RANGE

BBC/Master RGB-7 Pin Hitachi	£6.20	£7.13c
BBC/Master RGB-7 Pin Ferguson	£6.20	£7.13c
Centronics to Centronics Printer	£11.00	£12.65c
User Port Extension lead 0.5M	£9.00	£10.35c
1MHz Bus Extension lead 0.3M	£10.20	£11.73c

Wide range of leads in stock–please phone

Government & Educational orders welcome. How to Order: Enclose your cheque or P/Order made payable to CARE ELECTRONICS. Access or Visa cards welcome Please allow 7 days for delivery. Please add Post & Packing – a=£11.50; b=£5.75; c=£1.15; d=£2.30

HOMEWORK • REVISION • TUTORIALS

Maths Exam?

DIFFERENTIATION & INDEFINITE INTEGRALS:-

SOLUTIONS ON SCREEN!

VERSION 1.1

Watch your problems transformed mathematically into *worked examples* with

'SYMBOLIC CALCULUS'

In a radical departure from conventional software we offer:-

- **STEP BY STEP solutions**
- **EXPLANATIONS at every step**
- **Take problems from any book or paper!**
- **Covers fundamental and advanced work**
- **Product, Quotient & Chain rules**
- **Integration by parts**
- **Integration by substitutions**
- **Integration of powers of SIN and COS**
- **e, Logs, SIN, ARCSIN, SINH, ARCSINH etc.**
- **Choice of variables**
- **Editor with error trapping**
- **Designed to encourage experimentation**
- **Extensive printer support**

Symbolic Calculus is a powerful string handling program linked to a mathematical knowledge base.
Problems can range from the very complex to the deceptively simple.
If one technique fails to solve the problem, Symbolic Calculus will start again applying a different method and so on until solved

Learn the BEST way – by example.

Maths Workshop

DEPT. MU,
95 South Avenue,
Worksop, Notts.
S80 2RE
Tel.: 0909 500599

Outside Europe add £3.00

Please send me SYMBOLIC CALCULUS on cassette (£15.95)/40T disk (£16.95)/80T disk (£16.95).
Please specify computer i.e. BBC B/B+/Master 128
(Model B owners who wish cassette state Basic 1/Basic 2)
I enclose a cheque/PO payable to
MATHS WORKSHOP

Name ....

Address ....

....

....

MU11

SOFTWARE SCENE

Triple Decker volumes 4 & 5 ... a mixed bag

HOWZAT!
ALTERNATIVE SOFTWARE
3 GAMES FOR THE PRICE OF ONE
FISHING
GOLF
AN ALTERNATIVE
TRIPLE DECKER 4
ELECTRON/BBC
199 RANGE
STAR FIGHT
SKRAMBLE
KARATE WARRIOR
TRIPLE DECKER 5

Price: £1.99 each (tape)
Supplier: Alternative Software, Units 3-6 Baileygate Industrial Estate, Pontefract, West Yorkshire WF8 2LN.
Tel: 0977 797777

NOT too long ago it was considered to be good value if you could pick up an arcade game for £1.99 – nowadays Alternative Software is churning out three-game compilations at the same price.

A sporting theme is in evidence on Triple Decker volume four, with Cricket, Golf and Fishing as the pastimes on offer.

Howzat represents the next step up from the old fashioned, pencil, paper and dice game that was popular when I was a lad – everything is still reliant upon random numbers, but the game is acted out on the screen to add extra interest.

Players' names for the two teams involved may be typed in manually, or you may choose to use the pre-programmed English and Australian teams.

A rapidly drawn aerial view of the pitch and players is displayed for your entertainment – the grass is green and the stick-men are black. These graphics are hardly state of the art, but adequate for the purpose.

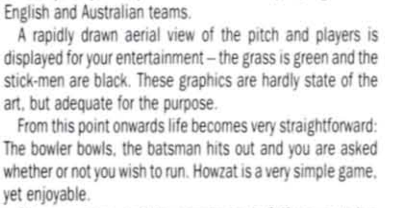
From this point onwards life becomes very straightforward: The bowler bowls, the batsman hits out and you are asked whether or not you wish to run. Howzat is a very simple game, yet enjoyable.

Game number two of the compilation is **Golf**, for up to five players. The aim is to complete the nine hole course in the least number of shots, though I doubt whether many people will have the stamina to complete a single – incredibly boring – round.

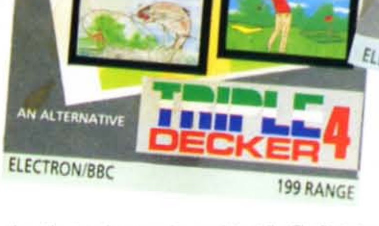
Using any of the eight compass directions you guide a white dot along a map of the hole, eventually reaching the large black dot at the far end. All of this excitement was far too much for me, so I loaded up number three – **Fishing**.

You are provided with such vital information as weather conditions and water speed and depth, from which you must make the correct choice of hook, bait and weights. Out on the well-drawn river bank you decide whether to cast near or far and at what depth.

With your bait in the water you can settle back and wait. Within seconds your float will begin to twitch, hand hovering above the spacebar you poise, ready to strike. The float goes under completely and bang... you're into your first fish. And for the ridiculous sum of 66p you couldn't find a better game.



Starfight



Fishing

Volume five comprises two space games and a karate program. Offering number one is titled **Starfight** and represents shoot-'em-ups at their most basic.

The screen displays the view from your cockpit as you orbit the planet M101/3. A small blip appears and begins to increase in size as it approaches – using four badly chosen keys you must blast the blip.

An on-screen rangefinder counts down as the alien ship homes in on your position – the further away the target, the more points you score if you hit it. When the rangefinder reaches zero you lose your one and only life. Starfight is an uninspiring game made worse by the terrible choice of control keys.

Skramble, as you might expect, is a horizontal scrolling zap and blast game. A continuous stream of alien ships and missiles fly smoothly from right to left across the screen – all you have to do is shoot them. Blasting the aliens is quite easy – they fly in perfectly straight lines and don't fire back.

The alien plan is to defeat you through sheer strength of numbers – after a couple of minutes flying time you will find yourself struggling to find a clear path through the alien swarm. Shooting them doesn't help, as this merely converts the alien into a fireball that continues on its original course.

Good use of colour and smooth animation make Skramble a worthy part of this collection.

Game number three brings you back down to earth with a bump... a kick and a nasty looking punch. **Karate Warrior** is a fine-looking game that has one major failing – it can only be played by two players.

As with all martial arts games, your success is dependant upon your ability to string together a winning combination of kicks and punches. The usual selection of 16 moves has been reduced slightly – to a grand total of four.

The two single-colour warriors perform their ritualised combat with flicker-free ease; it is such a pity that the micro is unable to defend itself. Karate Warrior could have easily been a good game.

In spite of their varied quality you will have to search far and wide to find better products at this price.

Jon Revis

Sound	*5*
Graphics	*6*
Playability	*7*
Value for money	*9*
Overall	*7*

SOFTWARE SCENE

Colossus Bridge 4 ... a helping hand

Price: £15.95
Supplier: CDS Software, CDS House, Beckett Rd, Doncaster DN2 4AD.
Tel: 0302 21134

HAVE you ever wanted to learn to play Bridge? If you decide to take the plunge, make sure you find a partner with the patience of Job and opponents with similar ability to your own or you could be put off the game for life!

On the other hand you could try using a computer simulation.

Although it's not the ideal way to learn, it does have a couple of advantages over the conventional method: You can't annoy your partner if you do something stupid – and even more important, your opponents can't gloat over the inevitable whitewashes in the early stages.

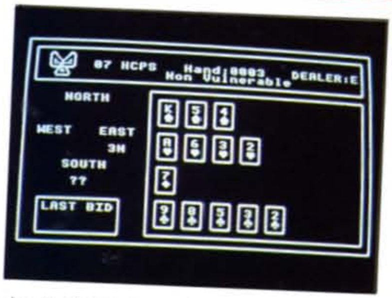
You bid each hand according to the Acol system, and the experts among you will no doubt be pleased to learn that Colossus Bridge 4 supports the Blackwood, Baron and Stayman conventions and the strong two club and take out doubles.

You can opt to play without having to bid, to adopt a weak or strong no-trump convention, and to set your response rate to fast, medium or slow. These can be changed at any time.

Colossus has a tutorial and game as separate programs, so you must make your choice before loading the one you require. It's options make it user friendly and, if required, these can be changed between hands at the press of a key.

When using either the tutorial or the rubber you play a hand in two distinct stages: The bidding and the play. Your hands during the bidding, and dummy's during play, are displayed graphically, sorted in suit order.

Bidding is simply a matter of typing in a value followed by a letter to indicate the suit – such as 2D for two diamonds.



The tutorial program uses 10 preset hands specially chosen to illustrate the game's various aspects, its strategy and conventions.

At the bidding stage your bid is only accepted if you make the recommended one – make an error and you'll stare vacantly at the screen until you guess, sorry choose, correctly.

The same applies during the play of the cards, when again you must get it right before the game continues.

At the end of each hand there's an explanation of the particular facet of bidding or play that it was designed to convey.

This package has several other features. You can recap the bidding, view the play to earlier tricks, peep at other hands, claim remaining tricks, or exit a hand at any time to rebid and replay it or move on to the next.

There is also a save/load game option, an autoplay feature and a facility to have a card recommended – both extremely useful for the learner.

With clear, concise instructions and excellent presentation Colossus also includes a guide to the recommended bidding for certain point counts and hand distribution, but no help regarding what card to play under what circumstances.

COLOSSUS 4 BRIDGE
W
S
INCLUDES FREE PAPERBACK 'BEGIN BRIDGE' BY G.C.H. FOX
CDS Software LTD
BBC MODEL'B', 'B'+ AND MASTER DISK

To compensate, it does include a free 125-page paperback book – Begin Bridge published by Elliot Right Way. And very useful it was too when I found myself in trouble. A quick glance often provided all the help I needed – and my silicon opposition never found out.

I'm not really in a position to assess whether this plays a good game or not. But my wins and losses have been sufficiently evenly distributed to make me keep playing.

As Bridge tutors go, Colossus Bridge 4 seems to do the job it set out to do.

David Andrews

Sound	*n/a*
Graphics	*7*
Playability	*10*
Value for money	*7*
Overall	*8*

Cheat It Again Joe ... making things easy

Price: £2.99 tape, £4.99 disc
Supplier: Impact Software, Neepsend House, 1 Percy Street, Sheffield, S3 8AU.
Tel: 0742 769950

AFTER I started the Hac-Man column I began receiving, at regular intervals, copies of The Pokes Disc, a collection of pokes and cheat routines for many of the best-selling BBC Micro games.

These offered exceptional value for money: Priced at the level of a budget game, they offered help – in the form of pokes, passwords, hints and tips – for almost every possible aspect of many of the top games.

This enterprising venture was the brainchild of Mark Gidley, a highly talented individual who also devised all the pokes.

Cheat It Again Joe is, in effect, an updated version of Mark Gidley's Pokes Disc, with Impact Software's marketing muscle behind it. It comes as two volumes – with a third being released soon – on either tape or disc, and each is available separately. However, the two really complement each other, and I would certainly recommend buying them together.

When I first heard that Cheat It Again Joe was under development, my feelings were mixed. Certainly, this sort of product could raise a number of problems, both legal and moral. When I received my copies, however, I was glad to see that Cheat It Again Joe avoids any such transgressions. The cheat routines are themselves encrypted and give nothing away to anyone who manages to disentangle them.

In common with its Pokes Disc predecessors, Joe offers exceptional value for money to fans of many of the major titles released in the last couple of years. For a mere £3, tape owners receive a generous selection of pokes for 20 top titles. However, disc drive owners fare even better: For an extra £2 they get pokes for the disc versions of 20 games, plus all the pokes from the cassette.

Cheat It Again Joe is certainly rather unusual, in that – to the best of my knowledge – it is the first offering of its kind released by a major company.

In the business software field many of the industry-standard databases, spreadsheets and the like benefit from software add-ons that make them more powerful or easier to use. So why not produce software add-ons for games?

I have often received letters saying that routines featured in my column have drawn old games out of the cupboard and given them a new lease of life; Joe offers further helpings of the same.

The collection seems to have been designed with the novice user – or at least the novice hacker – in mind, and a

Alerion ... bird without wings

Price: £14.95 (Archimedes only)
Supplier: Dabs Press, 76 Gardner Road, Prestwich, Manchester, M25 7HU.
Tel: 061-773 2413

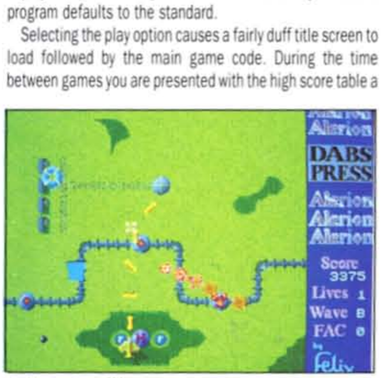
VERTICAL scrolling shoot-'em-up games have been available for a long time on 16 bit micros and have reached the stage where new ones invoke yawns of boredom. But in the Archimedes field only two have become available, the first – from a group of students – was certainly a creditable effort. Now we have a professional one from Dabs Press.

Booting up the game is the same as for any BBC Micro – Shift+Break – but if, like me, you usually sit with your finger on the Shift key waiting for something to happen, you are out of luck. When you take your finger *off* the program starts to load.

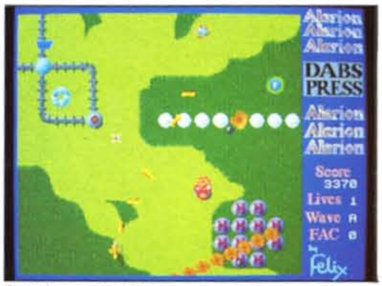
An option screen is loaded which gives you a choice of a demo, changing the key selections and playing the game itself. Each can be selected either with mouse or keyboard.

The second option shows the default settings and a representation of the keyboard; you use the mouse to click the keys you want, and if you choose the same key twice the program defaults to the standard.

Selecting the play option causes a fairly duff title screen to load followed by the main game code. During the time between games you are presented with the high score table a list of all the targets and a page of information about spikes, H and F bases. You have to dodge the first, the last H base you fly over becomes the start point for your next life, and landing eight shots on an F base gives you one FAC – a jamming system that makes your ship invisible.



Locking on to an H base



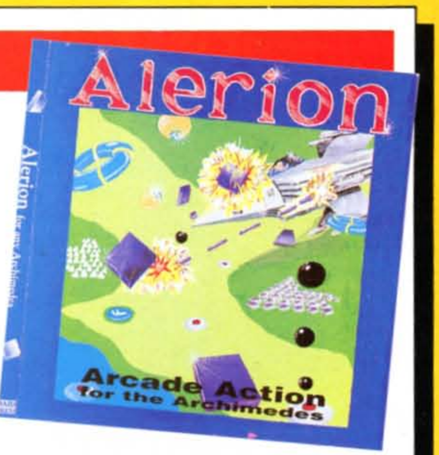
Targetting on ground bases

Pressing Return takes you into the game proper. The default keys are fairly standard: Z/X for left/right movement,] and / for accelerating up the screen and slowing down to move back. Pressing Return gives you very strange air-to-air missiles and the Alt key produces air-to-ground shots – crosshairs are positioned a third of the way up the screen from the ship itself and that's where any ground fire will hit if you use it. Pressing the spacebar activates the FAC when you've hit the F bases enough times.

You have a plan view of the terrain as it scrolls from the top of the screen and the landscape slowly unfolds. Strange objects move down at you while others move from side to side. These are dangerous and have to be eliminated with the air-to-air shots – but just keeping Return pressed satisfies that.

The real problems come in the form of ground-based rocket launches that literally erupt from the terrain and begin to fire black missiles at you. They aren't very accurate, but at first, what with dodging them plus everything else going on, you'll soon succumb and lose a life.

The launchers can be dealt with by your ground missiles – but you can't fire both types of missiles at once. One thing I noticed was that not all the ground bases fire until I knocked out one of the others, so there's no point in gratuitously hitting every base, as it only activates others. There are several levels, but they are all strung together without a break. At higher levels there are vicious floating balls that home in on you.



My main disappointment with the game is its scoring system: The highest valued objects – Flippers – appear on the first level only. This means that to get a high score you just hit everything in sight without going over an H base. Then when you do get killed you restart at the start of level 1 with another set of Flippers to knock out.

The sound is fairly good with plenty of digitised explosions and there is some speech too, telling you when you've flown over an H base or moved to the next level. But there's nothing spectacular and no music.

Lazarus

Sound	7
Graphics	6
Playability	9
Value for money	8
Overall	8

---

great deal of thought has been put into making the system easy to use. The tape or disc is loaded in the usual way: CHAIN"" and Shift+Break respectively. Once the first part has finished loading, the micro presents you with a list of names of the games featured in that volume.

Using the cursor keys moves a highlight bar up and down the screen and pressing Return selects the game. Alternatively, pressing spacebar presents another page of game titles.

When|you've selected a game the micro tells you about the cheat facilities provided for it and another press of the spacebar brings up a request for the version of your game.

In some cases, such as Superior's Repton 2, Joe caters for both the original stand-alone game and a compilation version. The disc version of Joe caters for all four versions of Repton 2 – the original tape, the original disc, the Superior Collection tape and the Superior Collection disc. Once the version is selected the appropriate poke routine is loaded and you are prompted to insert the tape or disc. Follow the on-screen instructions and the game will load, apparently normally, but with all the promised modifications in place.

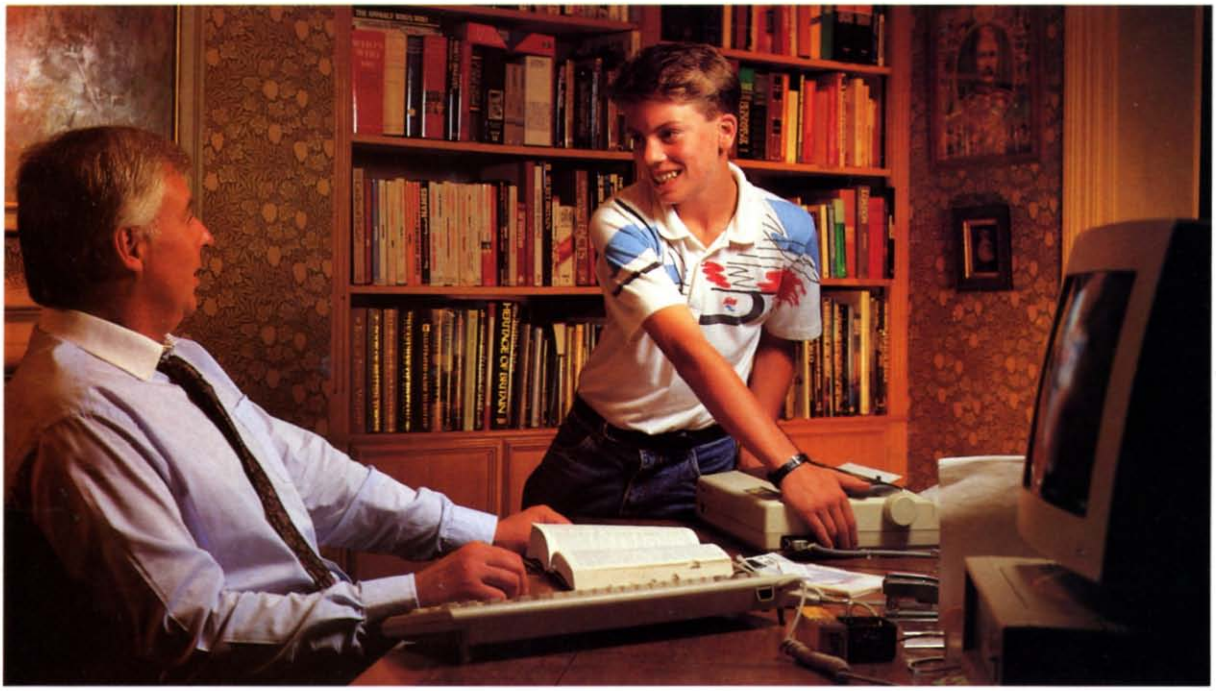
As one who can claim to specialise in this sort of thing, I know how long Mark must have spent devising the pokes in these compilations, and the result is very worthwhile.

Hac-Man

Sound	N/A
Graphics	N/A
Playability	9
Value for money	10
Overall	9

Cheat It Again, Joe
Volume 1
Cheat it again, Joe 1
BBC Micro

The day Daniel's dad brought his office printer home.



My dad's firm is always busy so he has lots of LC-10 printers at his office.

In fact, he sometimes has so much work to do that he keeps a personal computer in his study so he can bring work home.

But when he's really busy, he brings home one of those Star printers too.

Of course, I know exactly how to use them because we have the colour version at school.

It can print documents in six different colours.

So I'm not surprised WHAT MICRO? called the LC-10 the 'Best Budget Dot Matrix Printer' on the market.

What's more it's a lot less expensive than other printers but much better quality.

(My friend, Philip, even has one for his Commodore.)

For a start the front control panel is child's play.

The six different fonts give you so many different style options when you print things.

It's pretty fast too with a draft elite speed of 144 cps and high density near letter quality at 36 cps.

There's also the LC-10's special feature called 'push-tractor' which gives the lowest tear-off position of the paper.

And you can park continuous paper and automatically load single sheets – and I think that's unique for this sort of printer.

You know, if I keep my paper round going for a few more weeks I'll soon have enough to buy my own LC-10.

And then for a small fee, dad can borrow mine.

THE star COMPUTER PRINTERS

Star Micronics U.K. Ltd.
Craven House, 40 Uxbridge Road,
Ealing, London W5 2BS.
Telephone: 01-840 1800.

A division of
Star Micronics Co., Ltd., Japan.

Please send me details of the Star LC-10 business printers.

Name ____________

Company ____________

Address ____________

____

Postcode ____________ Telephone ____________

Or just call Belinda on 01-840 1829.

LT/MU11

Making the right connections

Andrew Moore presents a game of cunning between you and your BBC Micro or Z88

BRIDG-IT is a compulsive two-player strategy game from the same family as Reversi, Connect-4 and Go. It's a satisfying pastime and, as your Z88 or BBC Micro is always available as a willing opponent, you can play it anywhere at any time. As with all good tactical games the rules are very simple. The board consists of a rectangle of black pegs interlaced with white ones and the two players each use one colour.

A turn consists of joining two adjacent pegs of your own colour without cutting across an opponent's connection. Black wins by connecting the left-hand side of the board to the right, and White must connect the top to the bottom. As an example the board in the diagram – which is only one quarter the size of a real board – shows a position where the black player can win by joining the middle two black pegs.

The traditional way of implementing games of strategy is to use something like the Minimax principle. On the program's turn it has to look at each possible move it could make and for each of these consider each of the opponent's responses and so on, down to several levels of search.

In a game like this, with many possible moves at each stage, the number of positions which need to be checked multiplies to huge numbers and as well as resulting in rather a long and complex program.

The delightful thing about Bridg-It which separates it from similar games is that there is a relatively simple algorithm for the machine to quickly decide which moves might be useful. In fact in this implementation, the details of board layout and checking to see if someone has won proved harder to implement than the tactics.

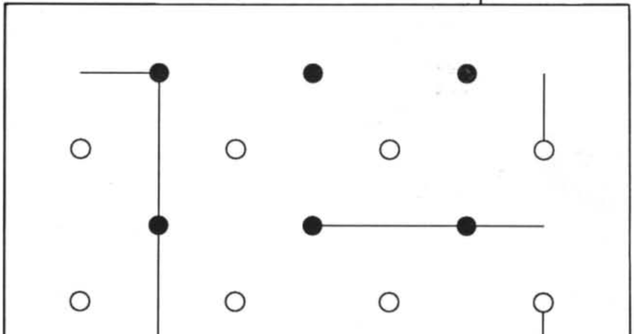
The program was developed on a Z88, and a key feature of the design is the isolation of the machine-independent parts from the areas of the program such as display and input which have to be altered for the BBC Micro. This means that all the parts of the program which would only run on one of the machines are hidden away from the main body of the program.

As well as providing the usual helpful software modularity, this means that when the software is to be converted to the other machine, you immediately know what bits need to be changed, what they should be changed to, and that the rest of the program can be left unaltered. In this case the machine independent parts of the program – about 80 per cent – are in the lines below 1000 with the dependent sections above.

Type in Listings I and II if you are going to run the game on a Z88 or Listings I and III if you're using a BBC Micro. Notice that the MODE statement and relocation routine have been put in the first few lines of the BBC Micro version. Save the program before you run it.

When you play you are offered two levels of

Turn to Page 37 ►



A position where the black player can win

MORLEY
E·L·E·C·T·R·O·N·I·C·S

Unit 3, Maurice Road Industrial Estate
Wallsend, Tyne & Wear NE28 6BY
Telephone: Tyneside (091) 2627507
Telex: 265871 A/B MONREF G
(Quoting Mag 70211)

TELETEXT ADAPTER

The adapter is housed in a plastic disc drive style case, similar in colour to the BBC Micro. It connects to the User Port via a 4-way ribbon cable and can take its power either from the computer or from our optional power supply.
The unit comes with the ATS (advanced teletext software) written for us by the BBC. The HOLD PAGE and REVEAL features are implemented, and pages can be saved to disc under your own filenames. Telesoftware is catalogued and selected from the Menu page, and the programs are easily downloaded.

THIS IS THE BIGGEST SELLING TELETEXT ADAPTER CURRENTLY IN PRODUCTION WORLD WIDE. AND COMES WITH A FULL MONEY BACK SATISFACTION GUARANTEE

Adapter BBC/Master	£104.20
Adapter Compact	£120.00
Adapter RML Nimbus	£104.20
Optional Power supply	£8.80
Teletext Utility Disc	£5.20

RAMDISC

Due to the rise in prices of dynamic RAM chips we only have a limited stock of the 1 megabyte version fo this device left.
Special offer price while stocks last
£150.00

EPROM PROGRAMMER V2

This state of the art unit, allows programming of 2764, 27128, and 27256 EPROMS both 12.5 and 21 volt. Totally under software control it is believed to be one of the fastest programmers available today.

The comprehensive user-friendly software included in this package has two main parts. The first allows EPROMS to be read, programmed, verified, and edited, also allowing a ROM image to be loaded or saved. The second is a full ROM management system in its own right, which has a host of useful features and routines, such as KILL and RESURRECT ROM to disable or enable a sideways ROM, dump ROM image to buffer or disc, move ROM, image in buffer to sideways RAM, and VIEW-SEARCH any sideways ROM

£30.00

Eprom programmer utility disc. Put all your favourite routines into Sideways Rom, both BASIC and M/Code. Allows multiple programmes up to 16K with separate * commands for initialisation and help.

£5.20

MASTER BOARD 'AA'

At long last the add-on all MASTER users have been waiting for, and internal ROM board.

No more need to turn the computer off to insert the cartridge containing the ROM you need to debug the program in memory.

The all new **MORLEY MASTER BOARD "AA"** allows you to have up to 8 x 16k and 4 x 32k extra Roms installed inside your MASTER and still leaves the cartridge slots free. This in effect allows your MASTER to support as many as 24, 16k ROMs installed permanently, with the addition of your standard 4 x sideways ram banks and four banks by using cartridges

A staggering 32 ROM images installed and accessible at any time.

Included in the package is a utility ROM which has many useful features including a clever file transfer program that transfers files between DFS and ADFS formats or vice versa.

£40.00

MASTER SMART CARTRIDGE

THE MORLEY/CARE SMART CARTRIDGE

The Smart Cartridge will at the press of a button halt a program running in memory and execute any one of a host of useful built in, or user defined procedures, and once completed will return to the program and continue where it left off. The only limiting factor with this device is the programmers imagination.

Some of the built in features (at the press of a button)

- Autosaves computer's entire memory.
- Freeze program at any point
- Screen Dump (any mode) to printer or disc.
- Allows most protected software to be backed up including tape to disc and disc to tape.
- User friendly menu driven software. etc.

£30.00

MASTER CARTRIDGES

From Care

Dual cartridge 2 sockets	£10.00
Quad cartridge 4 sockets	£14.00
Duet cartridge 2 x 32k sockets	£12.00
32k non-volatile ram cartridge ideal for Spellmaster dictionary	£33.00

VISA

SOFTWARE

We now stock a full range of Computer Concepts software and will gladly populate your 'AA' board and cartridge before despatch.

BBC & Master series computers

Interword	£49.00
Printmaster	£18.85
Intersheet	£49.00
Speech System	£34.70
Interchart	£32.00
Speech Processor	£5.00
Interbase	£60.00
Accelerator	£45.00
Mega 3	£85.00
Communicator	£60.00
Spellmaster	£51.30
Termi 2	£29.00
Wordwise Plus	£49.00
Sidewise	£38.00
Wordwise	£32.00

Archimedes

Interword	£39.00
Wordwise Plus	£30.00
Intersheet	£39.00
Arm assembly book	£12.95
Interchart	£25.00
Rom Podule	£49.00
Spellmaster	£51.30
Rom Podule & Battery	£59.00

SYNERGY

SHAREMASTER (BBC & MASTER) The Professional investment analyst and portfolio reporting system	£99.95

M/B SOFTWARE

Design 7+	£8.60
Desrom +	£11.20
Desfax	£17.40
Mastercopy Disc	£11.20
Mastercopy ROM	£13.00
Masterfax	£26.00
VU-FAX software	£45.00

BITS

27C128 16k CMOS EPROMS	£4.20
5.25 Floppy Discs x 10	£7.00
3.5 Floppy Discs x 10	£18.00

Coming soon

Winchester Drives
Master Speech Cartridge

VAT: UK Customers please add 15% VAT to cost incl. carriage.

CARRIAGE £1 on all orders. £3 on larger items (Adapters etc.)

To order:
By Post:- Enclose cheque made payable to **Morley Electronics Ltd.** or credit card no.

By Phone:- Quoting your Access, Visa number

Goods usually despatched by return

Government and Education orders welcome

FOR MORE DETAILED INFORMATION ON ANY OF THE ABOVE PRODUCTS PLEASE SEND FOR FREE CATALOGUE.

◄ *From Page 35*

difficulty. Choosing "hard" and letting the machine go first makes for an extremely difficult game. You are the black player and your goal is to connect the left side of the board to the right. When it is your turn, a cursor will appear, and you can move it with the arrow keys. Place it between the two black pegs you wish to join and press Enter or Return.

So, have fun with Bridg-It whether it's on a BBC Micro or the portable. If you enjoy sitting on the train with your Z88 looking extremely industrious, but occasionally don't have anything very productive to do, this might provide a perfect brain-stretching solution.

Listing I: The main part of the program

```
   10 REM Bridg-It
   20 REM by Andrew Moore
   30 REM (c) The Micro User
   40 DIM BD%(15,7):DIM CN%(15,7):PROCIN
IT
   50 REPEAT:PROCUSERGO:R=FNMYGO:UNTIL R
>0
   60 IF R=1 THEN A$="You win. Bleagh" E
LSE A$="I win. Hee hee"
   70 PROCMESS(A$+". Play Again? [Y/N]")
:IF FNYES RUN
   80 END
   90 DEF PROCINIT:PROCTITLE:PROCUDC
  100 FOR X=0 TO 6:FOR Y=0 TO 7:PROCAT(3
+4*X,Y+Y,0):PROCAT(1+4*Y,1+X+X,1):NEXT Y
:NEXT X
  110 X1=-1:Y1=0:X2=0:Y2=7:YOURGO$="You
start, then."
  120 PROCMESS("You'd prefer an Easy gam
e? [Y/N]"):IF FNYES THEN DIFF=4 ELSE DIF
F=20
  130 PROCMESS("Can I go first ? [Y/N]")
:IF FNYES THEN PROCGO(0,7):X1=0:Y1=7:YOU
RGO$="It's your turn now."
  140 ENDPROC
  150 DEF PROCUSERGO:PROCMESS(YOURGO$)
  160 IF X1 >= 0 THEN LX=X1:LY=Y1 ELSE L
X=7:LY=4
  170 REPEAT:PROCGETDXDY(LX,LY):LX=(LX+D
X) MOD 15:LY=(LY+DY) MOD 8:UNTIL K=13
  180 IF (LY=7 AND ((LX AND 1)=1)) OR BD
%(LX,LY)>0 THEN VDU 7:PROCMESS("Illegal
Move. Try again"):GOTO 170
  190 BD%(LX,LY)=1:PROCDJ(LX,LY,1)
  200 ENDPROC
  210 DEF FNYES:REPEAT:A=(INKEY(1) AND 3
1):UNTIL A=&E OR A=&19 :=(A=&19)
  220 DEF PROCDJ(X,Y,P):IF (X AND 1)=1 T
HEN 240
  230 IF P=2 THEN PROCAT(1+2*X,2*Y,3):EN
DPROC ELSE FOR Z=2*X TO 2*X+2:PROCAT(Z,2
*Y,2):NEXT Z:ENDPROC
  240 IF P=1 THEN PROCAT(1+2*X,2*Y+1,3):
ENDPROC ELSE FOR Z=2*X TO 2*X+2:PROCAT(Z
,2*Y+1,2):NEXT Z
  250 ENDPROC
  260 DEF PROCCHOOSEMOVE:X1=LX:Y1=LY
  270 IF LX/2=6-LY THEN X1=LX+2:ENDPROC
  280 IF LX/2=7-LY THEN X1=LX-2:ENDPROC
  290 IF LX+2*LY<13 THEN X1=LX+1-2*(LX A
ND 1) ELSE IF (LX AND 1)=0 THEN X1=LX-1:
Y1=LY-1 ELSE X1=LX+1:Y1=LY+1
  300 ENDPROC
  310 DEF PROCGO(X,Y):BD%(X,Y)=2:PROCDJ(
X,Y,2):ENDPROC
  320 DEF PROCSEEJOIN(X,Y,D):IX=X:IY=Y:R
X=X:RY=Y:DA2=1-(D AND 2)
  330 IF (D AND 1)=1 THEN IX=X+DA2:RX=2*
IX-X ELSE RY=Y-DA2:IF ((X AND 1)=0 AND D
=2) OR ((X AND 1)=1 AND D=0) THEN IY=RY
  340 BLOCKED=TRUE:IF IX<0 OR IY<0 OR IX
>14 THEN ENDPROC ELSE IF RY>7 THEN ENDPR
OC
  350 B=BD%(IX,IY):IF B=0 THEN BLOCKED=F
ALSE ELSE BLOCKED=( (B=1)=((IX AND 1)=(D
 AND 1)) )
  360 JOINED=B>0
  370 RC=FNLABELOF(RX,RY):ENDPROC
  380 DEF PROCFINDWIN(X,Y,C,D):PROCSEEJO
IN(X,Y,D):IF BLOCKED THEN ENDPROC
  390 IF JOINED AND (RC=0) THEN PROCCONN
ECT(RX,RY,C):ENDPROC ELSE IF RC=C OR RC=
0 THEN ENDPROC
  400 IF NOT WON THEN WON=JOINED:WINX=IX
:WINY=IY
  410 ENDPROC
  420 DEF PROCCONNECT(X,Y,C):LOCAL D:CN%
(X,Y)=C:D=0
  430 PROCFINDWIN(X,Y,C,D):D=D+1:IF D<4
THEN 430
  440 ENDPROC
  450 DEF PROCFOCUS(X,Y,P):XA=X:XB=X:YA=
Y:YB=Y
  460 IF P-(X AND 1)=1 THEN XA=X-1:XB=X+
1 ELSE IF P=1 THEN YB=Y+1 ELSE YA=Y-1
  470 LA=FNLABELOF(XA,YA):LB=FNLABELOF(X
B,YB)
  480 IF LA=0 AND LB>0 THEN PROCCONNECT(
XA,YA,LB)
  490 IF LB=0 AND LA>0 THEN PROCCONNECT(
XB,YB,LA)
  500 IF LA>0 AND LB>0 AND LA <> LB THEN
 WON=TRUE
  510 ENDPROC
  520 DEF FNLABELOF(X,Y):IF X=-1 OR Y=-1
 THEN=1 ELSE IF X=15 OR Y=8 OR ((X AND 1
)=0 AND Y=7) THEN=2 ELSE=CN%(X,Y)
  530 DEF PROCSWAPMOVES:T=X1:X1=X2:X2=T:
T=Y1:Y1=Y2:Y2=T:ENDPROC
  540 DEF PROCRANDOMGO:REPEAT:X1=RND(15)
-1:Y1=RND(8)-1:UNTIL Y1<7 OR ((X1 AND 1)
=0):ENDPROC
  550 DEF FNMYGO:PROCMESS("I'm thinking.
"):WON=FALSE:WINX=-1
  560 IF X1 >= 0 THEN PROCFOCUS(X1,Y1,2)
:IF WINX >= 0 THEN PROCGO(WINX,WINY) :=2
  570 PROCFOCUS(LX,LY,1):IF WON THEN=1 E
LSE IF WINX >= 0 THEN PROCSWAPMOVES:X1=W
INX:Y1=WINY:PROCGO(X1,Y1) :=0
  580 PROCCHOOSEMOVE:IF RND(DIFF)=3 THEN
 PROCSWAPMOVES
  590 YOURGO$="It's your turn."
  600 REPEAT:IF X1<0 THEN CANGO=FALSE EL
SE CANGO=( BD%(X1,Y1)=0 )
  610  IF NOT CANGO THEN PROCRANDOMGO:P
ROCSWAPMOVES:YOURGO$="Your go. You are d
oing well."
  620 UNTIL CANGO:PROCGO(X1,Y1) :=0
```

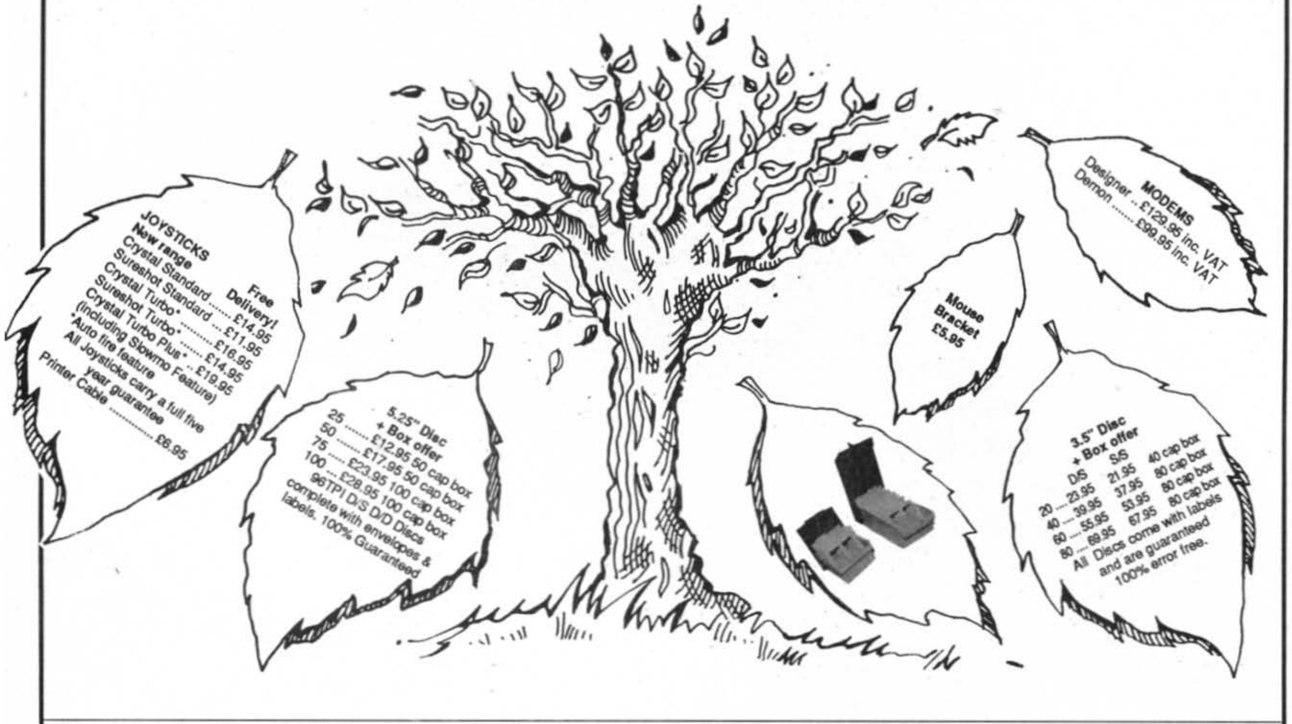
Listing II: The Z88 specific part of the program

```
 1000 REM Z88 Machine dependent part of
Bridg-It
 1010 DEF PROCTITLE:CLS:VDU 1,127,1,ASC"
S",1,ASC"T",1,ASC"U":PRINT "BRIDGE-IT"
 1020 VDU 1,ASC"U":PRINT "by Andrew Moor
e"
 1030 PRINT TAB(0,4);"YOU: LEFT TO RIGHT
":PRINT " ME: TOP TO BOTTOM":VDU 1,ASC"T
"

 1040 ENDPROC
 1060 DEF PROCU(N):VDU 1,130,63,65+N:END
PROC
 1070 DEF PROCUDC:RESTORE:FOR N=65 TO 74
:READ A$:VDU 1,138,61,N
 1080   FOR I=1 TO 8:VDU 93+ASC(MID$(A$,
I)):NEXT I:NEXT N
 1090 ENDPROC
 1100 DATA ?a?#####,####?E?#,?a?##M##,#M
##?E?#,?a?#+#+#,+#+#?E?#,#M######,#####M
##,+#+#####,#M###M##
 1110 DEF PROCGETDXDY(X,Y):VDU 1,67:PRIN
T TAB(1+X+X+20,Y);:K=GET:VDU 1,67
 1120 DX=0:DY=0:IF K=255 THEN DY=7 ELSE
IF K=254 THEN DY=1 ELSE IF K=253 THEN DX
=1 ELSE IF K=252 THEN DX=14
 1130 ENDPROC
 1140 DEF PROCMESS(S$):PRINT TAB(55,3);S
$;SPC(35-LEN(S$)):ENDPROC
 1150 DEF PROCAT(U,V,C):PRINT TAB(20+U,I
NT(V/2));:IF C<2 THEN PROCU(C):ENDPROC
 1160 IF U=30 OR U=0 OR V=15 THEN ENDPRO
C ELSE IF C=3 AND V=14 THEN PROCU(8):END
PROC
 1170 IF (V<14) AND ((U AND 1)=1) THEN P
ROCU(C+C-(U AND 2)/2-1):ENDPROC
 1180 IF 2*(V AND 1)-(U AND 2)=0 THEN K=
1 ELSE K=0
 1190 IF BD%(U/2-K,INT(V/2))=2-(V AND 1)
 THEN PROCU(9) ELSE PROCU(6+(V AND 1))
 1200 ENDPROC
```

Listing III: The BBC Micro specific part of the program

```
    1 IFPAGE<>&E00 GOTO1200
    2 MODE1
    3 *FX4,1
 1000 REM BBC Machine dependent part of
Bridg-It
 1010 DEF PROCTITLE:COLOUR 129:COLOUR 2:
CLS
 1020 PRINT TAB(8,3);"BRIDG-IT by Andrew
 Moore";
 1030 COLOUR 0:PRINT TAB(0,24);"You: Lef
t To Right";
 1040 COLOUR 3:PRINT TAB(23,24);"Me: Top
 to Bottom";
 1070 DEF PROCUDC:VDU 23,240,&3C,&7E,&FF
,&FF,&FF,&FF,&7E,&3C
 1080 VDU 23,241,0,0,0,&FF,&FF,0,0,0
 1090 VDU 23,242,&18,&18,&18,&18,&18,&18
,&18,&18:ENDPROC
 1110 DEF PROCGETDXDY(X,Y):PRINT TAB(6+2
*X,6+2*Y+(X AND 1));
 1120 DX=0:DY=0:IF FNK(-58) THEN DY=7 EL
SE IF FNK(-42) THEN DY=1
 1130 IF FNK(-26) THEN DX=14 ELSE IF FNK
(-122) THEN DX=1
 1140 IF FNK(-74) THEN K=13 ELSE K=0
 1150 ENDPROC
 1160 DEF PROCMESS(S$):COLOUR 2:PRINT TA
B(0,28);S$;SPC(38-LEN(S$));:ENDPROC
 1170 DEF PROCAT(U,V,C):PRINT TAB(5+U,6+
V);:ISWHITE=(C=1 OR ((X AND 1)+C=3))
 1180 COLOUR (-3 * ISWHITE):VDU 240+C+(C
>0):ENDPROC
 1190 DEF FNK(K):IF NOT INKEY(K) THEN=0
ELSE REPEAT:UNTIL NOT INKEY(K):= -1
 1200*KEY0 *TAPE¦MFORI%=0 TO TOP-PAGE ST
EP 4:I%!&E00=I%!PAGE:N.¦MPAGE=&E00¦MO.¦M
DELETE1200,1210¦MRUN¦M
 1210*FX138,0,128
```

AS THE LEAVES DROP . . . SO DO OUR PRICES!!!


JOYSTICKS
New range
Free Delivery!
Crystal Standard £14.95
Sureshot Standard ... £11.95
Crystal Turbo* £16.95
Sureshot Turbo* £14.95
Crystal Turbo Plus* .. £19.95
(Including Slowmo Feature)
*Auto fire feature
All Joysticks carry a full five year guarantee
Printer Cable £6.95
5.25" Disc + Box offer
25 .... £12.95 50 cap box
50 .... £17.95 50 cap box
75 ...... £23.95 100 cap box
100 ... £28.95 100 cap box
96TPI D/S D/D Discs complete with envelopes & labels. 100% Guaranteed
MODEMS
Designer .. £129.95 inc. VAT
Demon .... £99.95 inc. VAT
Mouse Bracket £5.95
3.5" Disc + Box offer
D/S S/S
20 .... 23.95 21.95 40 cap box
40 .... 39.95 37.95 80 cap box
60 .... 55.95 53.95 80 cap box
80 .... 69.95 67.95 80 cap box
All Discs come with labels and are guaranteed 100% error free.

TOP QUALITY BRANDED DISKS FROM THE No1 DISC SUPPLIER

Description	Price per box of 10
5.25" SS 48TPI	£9.95
5.25" DS 48TPI	£11.95
5.25" DS 96TPI	£15.95
5.25" DS HD 1.6Mb	£19.95

Description	Price per box of 10
3.5" SS 135TPI	£13.95
3.5" DS 135TPI	£16.95
3.5" DS HD 2Mb	£39.95

3M, Athana, Sony and Verbatim brands!
You choose what brand you need, we dispatch by return! Do not be put off by the super low prices.
Our large purchasing power enables us to offer you fantastic savings on these famous leading brands!

STORAGE BOXES – BEST RANGE – BEST PRICE

All boxes are lockable, and are supplied with 2 keys. Made from anti-static plastic, they are a top quality product at rock bottom prices

	1+	3+	5+	7+
140 x 5.25"	£8.95	£7.95	£7.49	£6.99
100 x 5.25"	£6.95	£5.95	£5.49	£4.99
50 x 5.25"	£5.95	£4.95	£4.49	£3.99

MIX 'N' MATCH FOR BEST PRICE!

3.5"Top Quality Bulk Packed Disks

	25	50	100	150
Single Sided 135T.P.I.	22.95	41.95	79.95	116.95
Double Sided 135T.P.I.	24.95	43.95	81.95	119.95

New Lower Prices

Rainbow Pack of five colours

	25	50	100	150
Single Sided 135T.P.I.	23.95	46.95	91.95	129.95
Double Sided 135T.P.I.	26.95	52.95	98.95	145.95

Rainbow disks are available in Blue, Red, Green, Yellow and Orange.
All discs are supplied with labels and are certified 100% error free

Top Quality Discs at rock bottom prices
5.25"

	25	50	100	150	250
SS 48T.P.I.	£9.97	£17.58	£30.88	£39.43	£58.43
SS 96T.P.I	£10.21	£18.05	£31.83	£40.85	£59.85
DS 48T.P.I.	£10.45	£18.53	£32.78	£42.75	£62.70
DS 96T.P.I.	£10.93	£19.48	£34.20	£44.18	£66.03
DS Col 96T.P.I.	£13.06	£24.46	£46.08	£62.23	£94.76
DS Rev	£14.25	£27.08	£47.98	£64.13	£97.38
Col & Rev	£14.25	£27.08	£47.98	£64.13	£97.38

All discs are 100% Error free. All discs come with envelopes and a full user set including labels & Write protect tab

CENTEC DISK SUPPLIES

UNIT 3, THE METRO CENTRE, BRIDGE ROAD, ORPINGTON, KENT BR5 2BE
TEL: (0689)35353 (6 Lines) (24 Hours) Fax 0689 77737

All disks are sent by Trackback or Courier service at no extra cost.

Please note we operate a call stacking system. Outside office hours a telephone answering machine will take your order.

E. & O.E. Remember – all prices include VAT and delivery! There are no hidden extras to pay! Personal callers welcome: Monday – Friday 9.30am – 4.30pm Prices apply UK only

Z88 Letters

WE have received lots of questions about the Z88, and answered several in the letters pages of recent issues of *The Micro User*.

Here Matthew Soar, consultant to Cambridge Computer, replies to some of your more technical queries.

Crashing converter

SINCE you started features on the Z88 I have been a regular reader of The Micro User *and am finding the Basic Editor published in the April edition very handy. But I have never developed much interest in programming despite having BBC Micros at work, so I was stumped when I found that the checksum converter listed in the same issue crashed at line 250 on the Z88.*

I had already taken out the reference to Mode 7 in line 40. Can you please tell me what changes to make in order to make use of this valuable routine, and will the short checksums in your February issue run on the Z88? – **Bill Fleming, Northfield, Birmingham.**

● The checksum converter was written for the BBC Micro, which uses a 6502 processor. The Z88 uses a Z80, so while both Basics are externally similar, internally the machines are completely different. This means that if a BBC Micro program uses machine code – as the ones you mention do – it will not work on a Z88. Also, as calculating checksums relies on how Basic is stored, the calculations would, in any case, be different.

A final point, which we have mentioned in Letters previously, is that creating Basic from checksums is impossible. Did you say the April issue?

Testing the buffer

FIRSTLY, can I congratulate you on your excellent coverage of the Z88. I await each new issue of The Micro User *with eager anticipation as to what hints, tips and new commands will be revealed. What all of us Z88 owners are dying to know is where all of this information is coming from – a mole at Cambridge Computer perhaps?*

Now to my problem, I am writing a special terminal program in Basic to drive an amateur packet radio interface and, thanks to your articles, I have worked out how to get data from and output it to the RS232 port. My problem is how to test if the output buffer is full and if the input buffer has data in it to avoid the program hanging at the BGET and BPUT statements. – **Denis Pibworth, Woodley, Reading.**

● To use the serial port – :COM.0 – at the device level, you need to use operating system calls and the information regarding this is only available in the form of technical notes.

To get them you should write to Peter King, Cambridge Computer Ltd, Bridge House, 10 Bridge Street, Cambridge CB2 1UE asking for a copy. Peter will send you a pair of non-disclosure documents which you must sign and return with a requested cheque for about £50 which covers the various costs involved.

Ever-open files

I AM generally very pleased with my Z88, but perhaps you could answer a question about its operation. Occasionally, as I try to refile a Pipedream document after editing, or as I try to erase a Pipedream file using the Filer command Erase, *the micro returns with a beep and the message* In Use.

Can you explain why this happens, and what I can do about it? I can find no useful information in the manual. – **R. Barnard, Altrincham, Cheshire.**

● The error message *In Use* normally means that the file you are trying to delete or save to is still open and being used by another application.

However the Filer associated with 2.2 and 3.0 versions of the machine contains a bug which manifests itself when you are cataloguing files if you pre-empt out of the filer on a page wait. The file that is next to be shown has been opened by the operating system to determine how big it is and when it was created but it is not closed when the pre-emption takes place. So from then on it is always *In Use* – open.

The only solution is to perform a Soft Reset – with the card flap closed press the reset button twice. All suspended applications are lost and all currently opened files are closed, including the rogue file.

We are receiving a large number of questions about the Cambridge Computer Z88. Some of them are dealt with here, and we will be answering more over the next few months.

So if you have any questions about the portable micro don't hesitate to send them to:

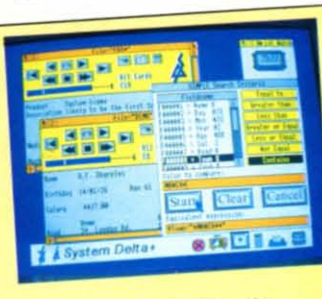
Letters, The Micro User, Europa House, Adlington
Park, Adlington, Macclesfield SK10 4NP.

We cannot give personal replies but will try to answer your question on the Letters pages.

MINERVA SOFTWARE FOR THE

Archimedes **£69.95 EACH**

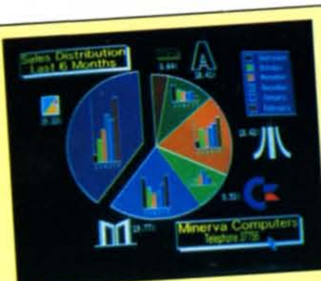
SYSTEM DELTA

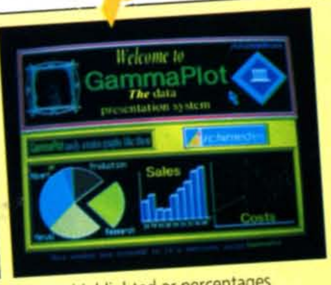


System Delta is the most comprehensive database available yet. It's so simple to operate that it has already become the standard in educational fields. It is very professional and pleasing in its presentation, making full use of the genuine Archimedes WIMP environment. It can handle vast amounts of data in the office, school or home, with its capacity of 2.14 billion records and 16 million fields. Its multiple 'key fields' allow any record to be found in 1 sec. even in a file of 20,000 records.

It maximises on the Archimedes' speed and has unique multi-tasking allowing an operation to continue on one file whilst performing a search or print on another. Easy file creation using free format screens with eight data types. Multiple display, print and report formats with each file including a user defined label facility. Three methods of search from simple option selection to in-depth multiple criteria, multiple fields or results of formulae. Comprehensive maths facilities allow results to be placed in other fields. Fast sort by any criteria on any number of fields. Transfer fields from one database to another. Imports data from other databases, exports data to Gamma and Sigma. Absolutely no programming required – but if you wish to program or customise then of course, we provide a full set of commands for you.

GAMMA PLOT

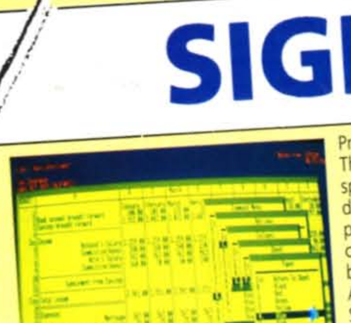




Seeing is believing! GammaPlot is an extensive chart/graph plotting program with a full art package included. It allows even a novice to produce stunning charts and drawings on one screen. Several charts may be placed on one sheet, in any position with text or drawings to make the data easily understood.

GammaPlot supports six main graph and chart types of line, scatter, pie, histogram, 3D histogram and text-only charts. Segments may be highlighted or percentages, values and labels switched on. Statistics are also available. Choose from the text styles supplied or any of the native Archimedes 'pretty fonts' or even define your own, and any of these can be enlarged or reduced. Various shapes, patterns and borders are supplied with a full 256 colour range. Full zoom facility. Various pen types are provided to draw pictures or add signatures. Import digitised pictures or company logos. Print facilities include colour output. Data entry is via the keyboard or any Delta, Gamma or Sigma file.

SIGMA SHEET



Probably the largest and fastest spreadsheet on any small business micro! The massive sheet size is 1000 columns by 16000 rows. Definable colours, spacing, and widths. Various cell formats including justification, up to 17 decimal places, preceding currency sign, bracketed or coloured negatives, percentage, exponential. Select to display the formulae instead of calculated sheet for really fast and easy sheet set up. Cell references may be alphanumeric or by label for ease of use, eg. A2 or "Jan' sales". Automatic relative or absolute reference adjustment while replicating. Simple yet extensive maths allowing calculations based upon references to other cells. Over 30 maths/statistical functions including SUM, AVG, COUNT, MAX, SIN, LOG, SQR, etc. Full date and time handling. Makes use of Maths co-processor, if fitted. Vertical or horizontal sheet calculation or intelligent mode which always gets it right no matter how the sheet is set up. Imports files from System Delta and most spreadsheets. Exports data to Gamma Range.

PLUS ACCOUNTS, GAMES & SPECIALIST SOFTWARE FOR ARCHIMEDES AND FULL RANGE OF SOFTWARE FOR ***THE BBC MICRO***

MINERVA SOFTWARE

69 SIDWELL STREET · EXETER EX4 6PH · TELEPHONE EXETER (0392) 37756

Magic with words

John Allen corrects a common mostake

Product: Z88 Spell-Master
Price: £59
Supplier: Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts, HP2 6EX
Tel: 0442 63933

FOLLOWING its release early last year, Computer Concepts' Spell-Master has rapidly become one of the most used pieces of software on the BBC Micro – and now it's available for the Z88. A spelling checker is basically a large dictionary together with software to compare words in the text with those in the the rom very quickly.

This simple approach means that it will accept *their* even though *there* was intended, or *man* when *main* is the required word. Nevertheless a spelling checker does pick up most typing mistakes and aids the correct spelling of infrequently used words.

Z88 Spell-Master comes on a 128k rom cartridge which adds two extra options to the Z88's Index: An application, QuickEdit – selected by □Q – and a pop-down WordFinder, entered with □W. QuickEdit is a text editor in which loaded files can be checked for spellings.

The BBC Micro version works within View, Wordwise or Inter-Word, checking the spelling of words as they are typed. Disappointingly Z88 Spell-Master will only do this within QuickEdit. So if you want to check a PipeDream document it has to be saved to a file and loaded into QuickEdit. After checking it has to be saved once more and re-loaded into PipeDream.

QuickEdit ignores PipeDream embedded commands within text, so at least you can check files in Pipedream internal format. But it does mean that if you've used more than one of PipeDream's columns the text is not very intelligible, as all of column one precedes all of column two and so on. Also replacing words with ones of a different length may cause text to go outside the set columns.

As with virtually all spelling checkers, Spell-Master allows you to build up your own user dictionary – additional words which are not in the main dictionary but ones that you want to be recognised as correctly spelt.

So what can QuickEdit do? As far as spell checking is concerned somewhat more than on the BBC Micro. There are diamond commands to check all text, check from the cursor onwards, check a word, check a marked block or check as you type. When it doesn't find a word in the dictionary it gives options to ignore the word, add it to your user dictionary or browse through the dictionary as on the BBC Micro version.

And there are two additional options: You can enter the correct word or words which then replace an incorrect word in the text – particularly useful if, for example, you've run two words

Turn to Page 43 ▶

MOVING DICTIONARIES

Transferring a user dictionary from the BBC Micro to the Z88:

- *Download the user dictionary to the BBC Micro Spell-Master editor, using the* Edit user dictionary *option.*
- *Remove the first two lines of header information using the editor.*
- *Use the Save text from editor option to save the dictionary in Z88 format.*
- *Transfer the file to the Z88. I used last month's BBC Link II program, although any link program between the two machines will do.*
- *Load the file into QuickEdit using the □FUL option.*

It's back! The show that ALWAYS keeps you one step ahead

ELECTRON &
BBC MICRO
USER SHOW

New Horticultural Hall, Greycoat Street, London SW1

10am-6pm Friday, November 11
10am-6pm Saturday, November 12
10am-4pm Sunday, November 13

e premier exhibition for users
ıll Acorn machines returns to
popular venue in the heart of
capital.

raditionally the liveliest event
he year on the Acorn
endar, the pre-Christmas
w is the one you just cannot
ord to miss.

your value-for-money
sport to:

70 exhibitors displaying all
he latest developments
across the entire Acorn
ange.

Archimedes World – which
provides a fascinating
glimpse into the current and
uture roles for this
emarkable machine.

Technical advice from the
JK's leading experts on all
Acorn computers.

Hundreds of special offers for
he BBC Micro and Electron
vaiting to be snapped up as
op-value Christmas presents.

this – and so much more –
he 20th record-breaking
ctron & BBC Micro User
ow.

can even save yourself £1
ore you get there by using
advanced ticket form.

ELECTRON & BBC MICRO USER SHOW

Advance ticket order

SAVE £1

Please supply tickets for November show:

☐ Adult tickets at £4 (save £1) .... £..........
☐ Under-16s tickets at £2.50 (save £1) .... £..........
☐ Cheque enclosed made payable to Database Publications Ltd. Total £ _____

Admission at door:
£5 (adults)
£3.50 (under 16s)
Advance ticket orders must be received by November 2, 1988

☐ Please debit my credit card account: ☐ Access ☐ Visa Expiry date: [/]

Name ....

Address ....

....

....Signed..

Post to: *Database Exhibitions, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.*

DATABASE
EXHIBITIONS

PHONE ORDERS: Ring Show Hotline: 0625 879920
Prestel Orders: KEY *89 THEN 614568383
MicroLink/Telecom Gold Orders: 72:MAG001
Please quote credit card number and full address

R174

THE MICRO USER
INNOVATION AWARDS
1988

Take a stroll down Innovation Row – a brand new show feature area, specially constructed for the event.

See the grand finalists displaying their breakthroughs in public for the first time. And you can help pick the winners by casting a vote in both categories of the awards – BBC Micro and Archimedes.

How to get there

Underground: The nearest tube stations are VICTORIA (Victoria, District and Circle Lines), ST. JAMES'S PARK (District and Circle Lines) and PIMLICO (Victoria Line).

By British Rail: VICTORIA STATION. The halls are a 10-minute walk from the station.

By Bus: 11, 24, 29, 70, 76 and Red Arrow 507 to Victoria Street – alight Army and Navy Stores.

◀ *From Page 41*

together. Or you can make a guess at what the word might be.

Such options in spelling checkers are always open to ridicule, but so far I've found that one of the guesses listed is usually correct. This sort of facility is present in the BBC Micro version as *FUZZY, and it's interesting to see that, like *FUZZY, the Z88 version won't cope with *ph* which sounds like *f*. Phor example, take the word *philosopher*. Spell-Master provided no guesses for *filosofer* or even *philosofer* As QuickEdit is also a text editor, it can in some circumstances be used as a substitute for a word processor, provided that you don't want to use highlight codes such as underline, effects like centring or to print out directly. Large amounts of text can be entered using the Check as you type option, the text then being loaded into a word processor for the addition of the highlights and effects before printing.

Text can be saved with Returns at the end of each line and these files can be loaded as plain text into PipeDream or read into View. Alternatively text can be saved in straight Ascii form – the file only contains Returns which have been explicitly typed – and this is a file format which is easy to load into Wordwise or Inter-Word. Indeed this facility may well make Z88 Spell-Master a worthwhile purchase, and gives a measure of compatibility between machines, since it costs less than buying View Professional for the BBC Micro.

WordFinder, like QuickEdit, allows you to browse through the dictionary and make guesses. It covers the same sort of options that you get with the star commands on the BBC Micro. The difference between WordFinder and QuickEdit is that with the former you enter the information on the keyboard, rather than it being derived from the text. It can be used, for example, within PipeDream if you're not sure how to spell a word.

Additionally, WordFinder will solve anagrams – provided that the result required is only one word – and search though the dictionary using wildcards, using # in place of single unknown letters and * in place of a group of letters.

WordFinder only takes into account the dictionary on the Spell-Master rom it does not use any of the words in your user dictionary – unlike QuickEdit.

I'm disappointed that it doesn't link up directly with PipeDream: If a link is not possible at least it would have been nice if QuickEdit were a basic word processor with highlights, limited effects and the ability to drive a printer. Nevertheless, it's one of the best roms yet for the Z88 and since it's been in my machine I've found it very useful.

> *'Wordfinder will solve anagrams ... and search through the dictionary using wildcards'*

DISK DRIVES

FROM £99·95 inc. VAT

The finest Japanese disc drives (not Taiwanese immitations) available at the lowest prices.

Stock Code	Description	Price inc. VAT
SP014	400K Single Drive 40/80T	£99.95
SP030	400K Single Drive 40/80T + PSU	£109.95
SP019	800K Dual Drive 40/80T	£189.95
SP020	800K Dual Drive 40/80T + PSU	£209.95
VPD0245	100K Single Drive + PSU	£119.95
VPD0246	400K Single Drive + PSU	£135.00
VPD0247	200K Dual Drive + PSU	£209.95
VPD0248	800K Dual Drive 40/80T + PSU	£235.00
VPD0249	800K Dual Drive 40/80T + PSU in Metal Bridge Unit	£265.00
V0062	3.5" 400K Single Drive + PSU	£99.95
V0063	3.5" 800K Dual Drive + PSU	£189.95

Please add £8.00 for insured courier delivery.

HOW TO ORDER

Simply write to us with your requirements enclosing a cheque/postal order or your credit card no. for the total amount. Don't forget to add the cost of delivery. Allow 7 to 10 days for delivery.

Credit card holders may order, for order value over £50.00, by telephone on our sales hotline 01-843 9903 (8 lines).

Orders from overseas should be exclusive of VAT (please deduct 15% from the total cost).

Showroom opening hours Monday to Friday 9.30 to 5.30 Saturday by appointment

CARTRIDGE SYSTEM

VIGLEN ROM CARTRIDGE SYSTEM

Stock Code	Description	Price inc. VAT
V560	Viglen Rom cartridge system for BBC	£12.95
V559	Viglen Rom cartridge system for BBC (low profile)	£12.95
V550	Viglen Rom cartridge system for Master	£14.95
V551	Viglen Rom cartridge system for COMPACT	£14.95
V561	Single Viglen cartridge	£3.45

Please add £2.50 P & P (£00.50 for single cartridge).

Viglen

Viglen Ltd., Unit 7, Trumpers Way, Hanwell, London W7 2QA
Telephone: 01-843 9903, Telex: 919 304 VIGLEN G
Fax: 01-574 5126

Access SALES HOTLINE 01 843 9903 VISA

WINCHESTER

MEGA BYTES FOR MINI BUCKS

NEW LOW PRICES

Stock Code	Description	Price inc. VAT
Drive 0 Single		
SPO150	VB20 20Meg Viglen Winchester	£479.00
SPO152	VB28 28Meg Viglen Winchester	£499.00
V155	VB40 40Meg Viglen Winchester	£769.00
V156	VB56 56Meg Viglen Winchester	£899.00
Drive 1 Second Drive		
SPO160	VB120 20Meg Drive 1 Winchester	£449.00
SPO162	VB128 28Meg Drive 1 Winchester	£469.00
V165	VB140 40Meg Drive 1 Winchester	£739.00
V167	VB156 56Meg Drive 1 Winchester	£769.00
V157	60MB Fast Tape Streamer Backup	£689.00

Please add £8 for insured courier delivery.

Available for use with SJ research file server at no extra cost, please specify when ordering.

OFFICIAL ORDERS

Official orders from education establishments, Government departments and Plc companies accepted Viglen has a special education department to process orders and queries from schools, colleges, universities and Local authorities so please ask for our education department when you call.

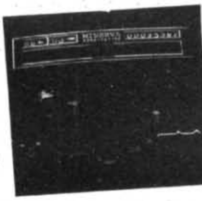
Being one of the major suppliers to the Education market, the experienced Viglen team will be able to understand and help you with your requirements.

Archimedes Games

£14.95 each

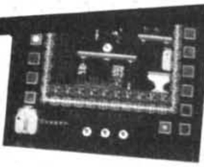
ORION

Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants - otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

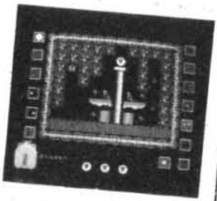


NEW

HOVERBOD



Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware ... the Ibbles and Squibbles start to materialise !!!!

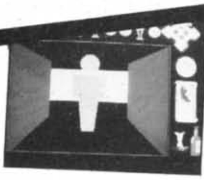


FREDDY'S FOLLY

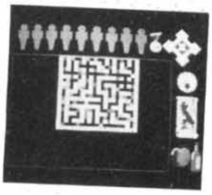
An enchanting game using animated graphics. Just watch the little men load the canon and pull it along. Notice the celebration when they win! Colourful fun for all the family. Sir Freddy is sneaky and envious of your castle so plans to bomb it with a fleet of balloons. You built a battlement to shoot down Sir Freddy in his balloon. Sir Freddy then hired several Gun ships to shoot your canon crew. Defend your castle and shoot down the balloons and the invading ships.

NEW

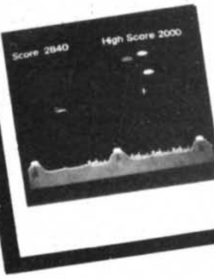
MINOTAUR



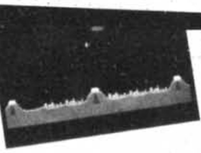
The Minotaur maze game is aimed at a market for children or adults who want a game where quick shoot-out reactions are not necessary. Theseus walks around the Labyrinth, collecting items to assist in the search of the ill fated men which have been provided as food for the Minotaur. The ultimate aim is then to kill the Minotaur and lead the men out of the Labyrinth to safety. The maze size is fully definable by the User. Games may be saved and reloaded for use at a later time.



MISSILE CONTROL



Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the missile launches and must do the utmost to protect the cities from the incoming missiles. On each subsequent attack further planes, satellites or 'smart' missiles attack the target cities.



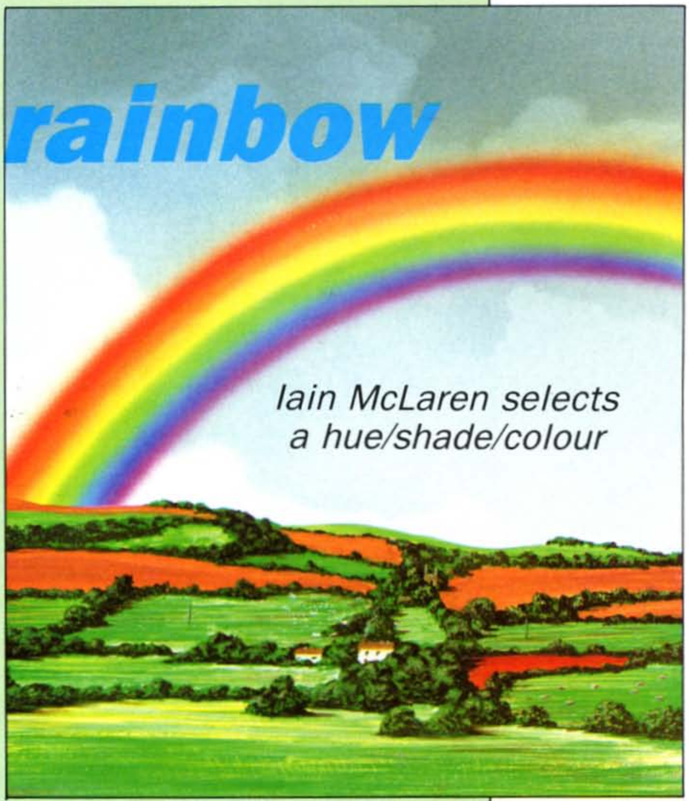
MINERVA

SOFTWARE

69 SIDWELL STREET · EXETER EX4 6PH · TELEPHONE EXETER 0392 437756

Please send me: ORION☐ HOVERBOD☐ FREDDY'S FOLLY☐
MINOTAUR☐ MISSILE CONTROL☐
Cheque/Access/Barclaycard
No ....
Name ....
Address ....
Signed ....

Over the rainbow



Iain McLaren selects a hue/shade/colour

CHOOSING the right colour for your Archimedes programs is usually a matter of trial and error, but with this little utility you can easily select and view what's available before starting to program. Although you could use the palette on the desktop for making your selection, you can't tell what red, green and blue values are needed to create the colours in your own program. What is needed is an easy way of displaying colours plus their elements.

Type in the listing and ensure it is correct using Get it Right! The program displays the red, green and blue – RGB – values in the middle of the screen along with a positive step value. By clicking the three mouse buttons you adjust the appropriate colour by the step amount. When a satisfactory one has been presented you can read off the RGB values from the screen and enter them into your own program.

ColourSet runs in Mode 8, but the colour values found will be right for any mode – except the 256 colour ones which are a special case and need the TINT command as well.

The whole of the screen background displays the desired colour, so when a bright one is being chosen the text colour changes from white to black. Interestingly, because of your eye's response to colour we only need to check the brightness of red and green for the colour change, not blue.

The increment value is contained in *A$* and is set to either *plus$* or *minus$*. Since there are only 16 levels for each colour, the on-screen step value could be 16, but the program responds too fast at this speed, so an increment of two is a satisfactory compromise. To shift between positive and negative incrementing just press the spacebar.

And that's all there is to it – a simple utility which is all you need to get just the right shades into your program.

COLOUR SELECTION

Two VDU19 commands are used to adjust the background and screen border colours. For each the parameters are used as follows:

```
VDU19,l,p,r,g,b
```

If *p* is 0-15 the *r, g* and *b* values are ignored and it – as a physical colour – is assigned to the logical colour, where *p* is 16 the *r, g, b* are assigned to logical colour *l*. Finally in the case of *p* being 24 the screen border colour is assigned the *r, g, b* values.

```
 10 REM > $.ColourSet
 20 REM by Iain McLaren
 30 REM (c) The Micro User
 40 MODE8:OFF:COLOUR 129:CLS
 50 plus$="+2":minus$="-2":A$=plus$
 60 red%=0:grn%=0:blu%=0:@%=3
 70 REPEAT WAIT
 80   COLOUR FNbright(red%,grn%,blu%)
 90   VDU19,0,24,red%,grn%,blu%
100   VDU19,1,16,red%,grn%,blu%
110   PRINTTAB(35,14)"Red   = "red%AND&F0
120   PRINTTAB(35,15)"Green = "grn%AND&F0
130   PRINTTAB(35,16)"Blue  = "blu%AND&F0
140   REPEAT WAIT
150     PRINTTAB(35,17)"Step  =  "A$
160     IF INKEY-99 THEN
170         IF A$=plus$ A$=minus$ ELSE A$=plus$
180         REPEAT UNTIL NOT INKEY-99
190       ENDIF
200     MOUSE X%,Y%,Z%
210     UNTIL Z%>0
220   IF Z%AND4 red%=FNrng(red%+EVALA$)
230   IF Z%AND2 grn%=FNrng(grn%+EVALA$)
240   IF Z%AND1 blu%=FNrng(blu%+EVALA$)
250   UNTIL FALSE
260 END
270 DEF FNrng(V%):IF V%<0 =0 ELSEIF V%>255 =255 ELSE =V%
280 DEF FNbright(R%,G%,B%):IF R%>160 OR G%>112 =0 ELSE =7
```

Get it right!

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = 47A1 1
 50 = CEF9 E
 60 = CAD8 C
 70 = D94C 0
 80 = DC3F 2
 90 = D57B E
100 = 7A2B 5
110 = 539A 4
120 = 6086 E
130 = 9B0D 3
140 = D94C 1
150 =  85D 6
160 = 4E98 0
170 = 94AA 2
180 = D856 2
190 =  8E1 3
200 =  800 4
210 = B724 8
220 = 326E 3
230 = C16B C
240 = 3A2E 3
250 = 226C 0
260 = FD2E 7
270 = 207F E
280 = DACB 5
```

Worlds ahead

Phil Tayler investigates a program which leaves you bereft of words

Product: Worlds Without Words
Price: £25
Supplier: 4Mation Educational Resources, Linden Lea, Rock Road, Barnstaple, Devon EX32 9AQ.
Tel: 0271-45566

THERE have been many text-only adventures, so why not a graphics-only one? This was Mike Matson's idea as he began work on Worlds Without Words, a program unlike any other I have seen. There are no on-screen instructions to read, neither are words required for input. Any interaction is by moving a pointer to specific areas of the screen using any one of a number of devices – Concept keyboard, touch screen or mouse.

The cursor keys are available by default, but the range of other input media makes the program accessible to children with a range of physical handicaps, while children with reading or language difficulties will find no restraint either.

The adventure revolves around the arrival on Earth of a spaceship with a strange being on board, but with no details of its identity or purpose – which leaves plenty of scope for discussion and class decisions.

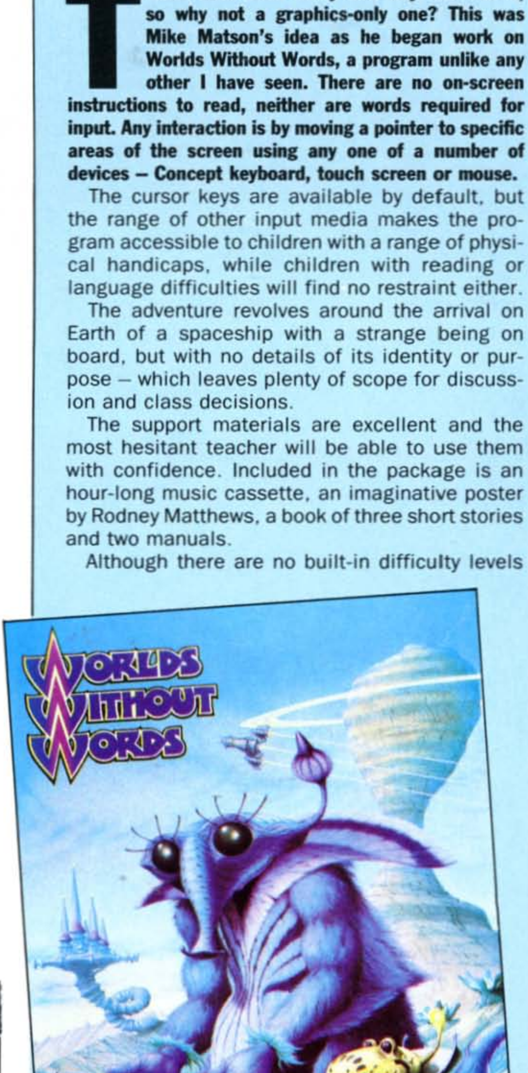
The support materials are excellent and the most hesitant teacher will be able to use them with confidence. Included in the package is an hour-long music cassette, an imaginative poster by Rodney Matthews, a book of three short stories and two manuals.

Although there are no built-in difficulty levels from a menu – indeed there is no menu at all – teachers could use this adventure in a number of ways, depending on the method by which it is introduced.

For instance, much discussion could precede using the software, and initial hints could be given. Alternatively it could be introduced with little or no explanation to children whose natural enthusiasm, initiative and curiosity would be sufficient.

There are several main problems to explore, although the path followed through them can be varied by the input made in an earlier screen. For instance, the Spinning Cubes problem can be solved in four ways, each solution branching to a different section of the adventure.

Another complete departure between this and any other adventure is the absence of any specific finishing point. Again, the key to the program's potential within schools is its flexibility. A very useful feature, which ought perhaps to be



Points for

- **Many input devices**
- **Language-free**
- **Immensely flexible**

Against

- **Requires teacher input**

Product: Book Builder
Price: £14.95
Supplier: HS Software, 56 Hendrefoilan Avenue, Sketty, Swansea SA2 7NB.
Tel: 0792 204519

YOUNGSTERS in school, no matter what age, will be familiar with word processors, and many will be seeking other outlets for their computer creativity. HS Software has come up with a novel and entertaining package to help in this sphere. It is said to be suitable for children aged seven and upwards.

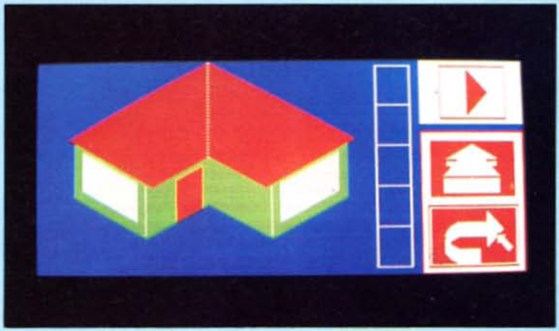
At its basic level, Book Builder is a kind of sprite designer and animator. In the section called *Make a Picture* a simple to use grid system is employed. Position a cursor and press a function key and a blob of colour is put in that space on the grid, and also on to an actual-sized sprite.

When producing animation, a clever system allows children to create one version of the sprite and then just make the required alterations to get a second position.

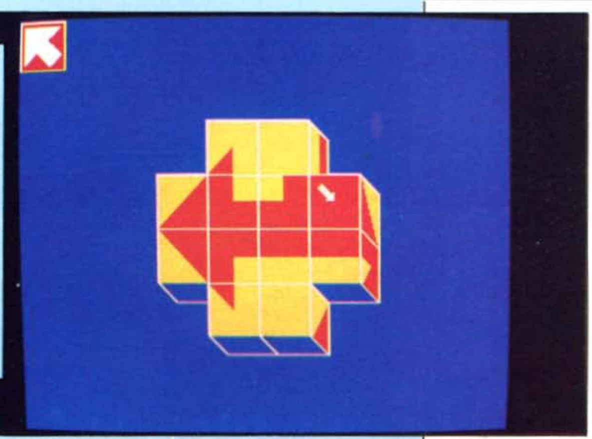
The first picture is best saved on the program disc, which has lots of free space. If it fills or if several groups are taking their turn with the program, it could lead to a lot of disc swapping, which most seven-year-olds don't find too easy. When I spoke to HS, they said that they would include two copies of the disc with the package which should go a long way towards solving that problem.

The next task is to incorporate the sprites into pages, and again the process is straightforward. You place the sprite at its start and end positions and the program automatically moves it between them.

You can put text on to a page – and make it



Moving to the next frame



Solving a problem

standard, is the facility to dump most screens to an Epson or Integrex printer – superb if you want to use the software as part of a project or display.

The Face Processor is an immensely complex and powerful section in which you can select from a wide menu of eyes and mouths and place in a sequence of up to 250 frames. This sequence can then be played back at a variety of speeds. The possibilities are enormous, including the design of a series of images to relay a message such as *I am hungry* or even a sequence for lip reading.

The philosophy here is vital to the whole concept – Worlds Without Words, being a series of starting points rather than an end in itself.

There are other equally open-ended activities such as the robot designing module. Here a robot must be constructed which can negotiate an obstacle course within its environment. This could lead on well into projects concerning modelling, control technology and the like.

This program has vast possibilities and is truly educational. I am sure that it will greatly influence the way in which we look at software for schools.

Building bricks

Rog Frost examines new creative software

move – but Book Builder makes no claim to be a word processor, so the child will have to ensure that the text can fit into the space allocated. Text can become cartoon style speech by linking it to a sprite with an arrow. It can also have built-in questions, where question marks are displayed on the screen and the reader has to type in the correct letters.

The order in which a page is put together governs the sequence in which items appear when the page is read. Complex pages with lots of pictures, words and questions can be assembled and the sections automatically displayed one after another or a *Press Space* prompt can be incorporated – the style is left to you.

Groups of up to 10 pages can be strung together to make a book. This feature allows for different groups of pupils to produce work on a common theme and then view them all in sequence. Once again, whole books can be saved on the disc.

The well-written manual, which comes with some planning grid sheets, warns that the more limited memory of the BBC B may prove a problem. My experience with children is that this is not the case and that complex pages can be built up. Indeed, I have been using the program on my Electron with an AP4 disc interface and it works perfectly.

Perhaps the weakest part of the program is the printout facility. This consists of a shaded graphics screen dump for Epson-compatible printers. Black and white just cannot do justice to the eight colour – plus flashing combinations – Mode 2 screen. In fact, good screen colour combinations appear as very similar shades, and all impact is lost. As colour printers get cheaper, perhaps HS would like to consider an alternative colour print routine – although flashing inks are hard to get hold of.

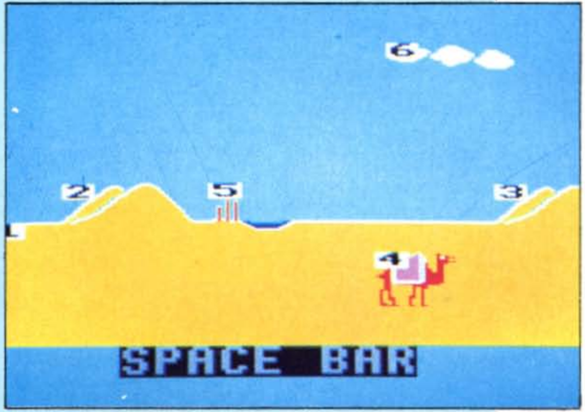
Book Builder is a well-produced and well-liked piece of software which deserves to take its place as a creative tool for children of all ages.

Points for

- **Creative addition for English skills**
- **Well written manual**

Against

- **Needs a lot of involvement from the teacher**



Stimulating simulation

A package for environmental science studies evaluated by Ian Dickinson

Program: Water Manager
Price: £16.10
Supplier: Cambridge Software House, The Town Hall, St. Ives, Huntingdon, Cambridgeshire PE17 4AL.
Tel: 0480 66805

WATER Manager is a decision-making package based on the activities of a water authority. It will be of use in the areas of project work in geography and environmental sciences in the middle and upper secondary age range. The point of the exercise is to ensure that the supply of water to a given locality is the correct amount necessary to survive.

One of the objects is therefore to spend and invest money wisely. The simulation would work as an intensive stand-alone exercise, but to obtain the full potential of the package, it is best used with small groups – possibly competing with each other.

Often, computer simulations do not introduce other wider aspects of a given topic. Water Manager does and it can open the door to a whole wealth of related criteria, not only the more obvious aspects of environmental studies. For example, it can be used in economics, information technology in the form of spreadsheets, history and so on – depending on the teacher's approach and experience.

Points for

- **Ideal as an on-going project**
- **Easy to use**
- **Comes with information pack**

Against

- **Doesn't accept lower case**

The software comes on a single 40 track disc although it was not labelled with the track format. The program is split into two main parts: Brief descriptions of the water cycle and basic information on what type of services have to be managed and the simulation itself.

You as the manager have to control the water resources efficiently and supply the town and village under your responsibility for as long as possible.

At the start of the game – and for subsequent years – you are shown a colourful moving graphics picture of the area under your control and the movement of the water cycle. From this point on you have to make decisions on how much to spend on the various aspects.

However, it is not always a question of simply trying to balance the books and keep the people happy. In an attempt to be as realistic as possible, various random events occur – a flood is forecast, the river levees had better be adequate or you will pay the price and so on.

You must make decisions on how to manage the natural and economic resources at your disposal. At any point you can ask for a situation report to see how things are progressing and it can be printed to be analysed later.

The actual decisions are taken by giving the program new values to work on. One annoying little thing here is that when the input has to be in the form of letters, lower case will not be accepted: This should be changed.

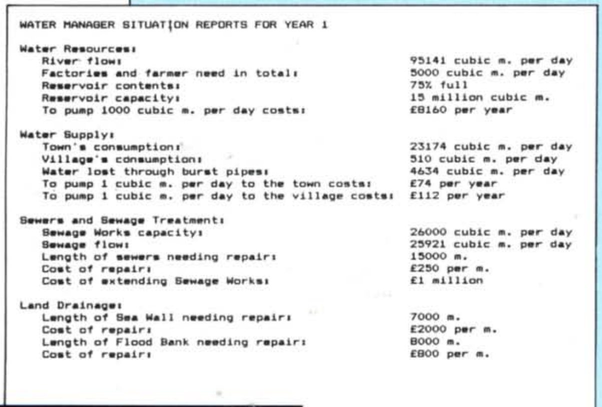
You have the option of saving and re-loading a game, which is useful if the program is to be used as part of an on-going project and is a feature that is often overlooked. A backup copy of the disc can be made so there are no worries about saving to the original disc.

The documentation comes in a well presented A5-sized booklet of 15 pages. The software itself is easy to use and self-explanatory, and the booklet suggests various approaches which may be useful. It also includes three experiments dealing with the production of salt by evaporation, a demonstration of how an aquifer stores water and a *working* water-treatment works.

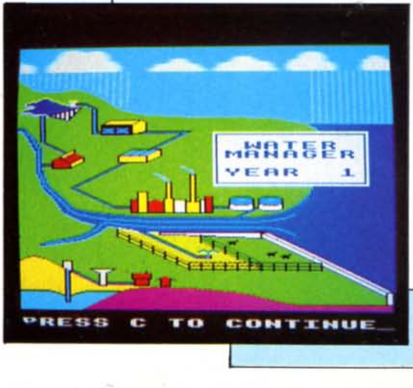
A useful supplement to the program is an information pack supplied by the Anglian Water Authority. It contains various small posters and pamphlets relating to the different aspects of water management and treatment. More packs can be obtained from the AWA if needed.

Overall, the software is very useful as both a tool for environmental sciences and an introduction into other areas of interest – positively encouraging pupils to make decisions about water management and related aspects.

This package should find a home in any school or geography department software library and can be recommended if one of your aims is to stimulate active participation.



```
WATER MANAGER SITUATION REPORTS FOR YEAR 1

Water Resources:
    River flow:                                   95141 cubic m. per day
    Factories and farmer need in total:           5000 cubic m. per day
    Reservoir contents:                           75% full
    Reservoir capacity:                           15 million cubic m.
    To pump 1000 cubic m. per day costs:          £8160 per year

Water Supply:
    Town's consumption:                           23174 cubic m. per day
    Village's consumption:                        510 cubic m. per day
    Water lost through burst pipes:               4634 cubic m. per day
    To pump 1 cubic m. per day to the town costs: £74 per year
    To pump 1 cubic m. per day to the village costs: £112 per year

Sewers and Sewage Treatment:
    Sewage Works capacity:                        26000 cubic m. per day
    Sewage flow:                                  25921 cubic m. per day
    Length of sewers needing repair:              15000 m.
    Cost of repair:                               £250 per m.
    Cost of extending Sewage Works:               £1 million

Land Drainage:
    Length of Sea Wall needing repair:            7000 m.
    Cost of repair:                               £2000 per m.
    Length of Flood Bank needing repair:          8000 m.
    Cost of repair:                               £800 per m.


                                        umped:    0

                                     (£1000):     0
                                                  2114

                                                  0
                                                  N

                                                  0
                                                  0

                                                  £3885014
```



AMAZING SOFTWARE Bargains OFFERS!

ELECTRON SPECIALS

ELECTRON COMPUTERS £59.95
(includes power supply, aerial lead & 90 day warranty)
PLUS ONE INTERFACE £49.95

PACKAGE ONE

PLUS 1, VIEW + VIEWSHEET £69.95

PACKAGE TWO

ELECTRON COMPUTER, PLUS 1, + VIEW Only £109.95

PACKAGE THREE

VIEW + VIEWSHEET ROMS £21.95

PACKAGE FOUR

LOGO,VIEW, VIEWSHEET For £49.95
And get LISP ROM FREE

PACKAGE FIVE

PLUS 1, VOLTMACE 3B Twin Joysticks with VIEW or VIEWSHEET £71.95

PACKAGE SIX

PLUS 1, LOGO, VIEW & VIEWSHEET £109.95
And get LISP ROM FREE

Lloytron
DATA RECORDERS
Suitable for the Electron or BBC
Only £19.95
Lead supplied FREE!

JOYSTICKS AT LOW PRICES

ELECTRON JOYSTICK INTERFACE & SOFTWARE **£14.95**

QUICKSHOT II TURBO JOYSTICK **£13.95**

BUY BOTH £24.95!

VOLTMACE DELTA 3B TWINS
~~£21.95~~ **£18.95**
For use with Plus 1 or BBC

VOLTMACE 14B HANDSET **£15.95**
INTERFACE FOR 14B **£14.95**

BUY BOTH £27.95!

VOLTMACE DELTA 31B SINGLE **£13.95**

VOLTMACE DELTA 35 **£12.95**
(for Master Compact)

SPECIAL OFFER

Cricket
Skyhawk
Jack Attac
Ice Hockey
Tennis
Roboto
Uranians
Hunkidory
Star Force Seven
Plan B
Squeakaliser
Savage Pond
Twin Kingdom Valley

BBC/ELE Cass
Any 5 for £9.95

SUPERIOR DEAL!

Death Star
* Mr. Wiz
* Chess
* Tempest
Fruit Machine
(* Ele Only)
Repton 2
Repton 3
* Draughts
* Overdrive
* Stranded
Invaders

Any 5 for £9.95 Cass only

KARATE COMBAT
Only £4.50

Archimedes

	R.R.P.	Offer Price
1st Word Plus	~~£91.94~~	£84.95
Alerion	~~£14.95~~	£12.95
Alpha Base	~~£49.95~~	£44.95
Ansi C	~~£113.85~~	£99.95
Arctist	~~£19.95~~	£17.95
Artisan Support Disk	~~£19.95~~	£17.95
Artisan	~~£39.95~~	£34.95
Autosketch	~~£90.85~~	£79.95
Creations Disk	~~£19.95~~	£15.95
Conqueror	~~£24.95~~	£19.95
Deltabase	~~£29.95~~	£25.95
Desk Top Enhancer	~~£29.95~~	£24.95
Flying Start 2	~~£99.95~~	£89.95
Fortran 77	~~£113.85~~	£99.95
Gama Plot	~~£69.95~~	£59.95
Graphic Writer	~~£29.95~~	£24.95
Hoverbod	~~£14.95~~	£11.95
Interchart	~~£28.75~~	£24.95
Intersheet	~~£44.85~~	£39.95
Interword	~~£44.85~~	£39.95
ISO Pascal	~~£113.85~~	£99.95
Kermit	~~£56.35~~	£49.95
Lisp	~~£228.85~~	£219.95
Logistix	~~£113.85~~	£99.95
Minotaur	~~£14.95~~	£11.95
Missile Control	~~£14.95~~	£11.95
Nominal Ledger	~~£64.95~~	£54.95
Order Processing/Invoicing	~~£64.95~~	£54.95
PC Emulator	~~£113.85~~	£113.85
Personal Accountant	~~£279.99~~	£249.95
Pipedream	~~£113.85~~	£99.95
Presenter	~~£28.69~~	£24.95
Prolog	~~£226.95~~	£215.95
Purchase Ledger	~~£64.95~~	£54.95
Sales Ledger	~~£64.95~~	£54.95
Sigma Sheet	~~£69.95~~	£59.95
Sound Synth	~~£49.95~~	£44.95
Spellmaster	~~£58.99~~	£49.95
Stock Management	~~£64.95~~	£54.95
System Delta Plus	~~£69.95~~	£59.95
Terramex	~~£19.95~~	£17.95
Toolkit Module	~~£39.95~~	£34.95
Twin	~~£33.35~~	£29.95
U-Connect	~~£59.95~~	£49.95
View 3	~~£59.80~~	£49.95
Wordwise +	~~£23.00~~	£19.95
Zarch	~~£19.95~~	£17.95

BBC BUSINESS AND DESKTOP PUBLISHING

	Offer Price
View Professional	£79.95
Overview	£78.45
Admin Extra	£11.55
System Delta	£54.95
Fleet St Editor (state 40 or 80t)	£31.95
Fonts & Graphics (state 40 or 80t)	£10.99
AMX Mouse & Superart	£69.95
Pagemaker	£39.95
Extral Extral	£19.95
Fontwise+	£15.95

MICROPOWER AND OTHER GAMES

ELECTRON	
Giroscope	~~£6.95~~
Bandits at 3 O'Clock	~~£6.95~~
Escape from Moon Base Alpha	~~£7.95~~
Ghouls	~~£7.95~~
Stock Car	~~£7.95~~
Killer Gorilla	~~£7.95~~
Rubble Trouble	~~£7.95~~
Swoop	~~£7.95~~
Croaker	~~£7.95~~
Bumble Bee	~~£7.95~~
Positron	~~£7.95~~
Felix & the Fruit Monsters	~~£7.95~~
Cybertron Mission	~~£7.95~~
Moonraider	~~£7.95~~
Felix and the Evil Weevils	~~£6.95~~
Frenzy	~~£6.95~~

BBC	
Giroscope	~~£7.95~~
European Knowledge	~~£7.95~~
World Geography	~~£7.95~~
Junior Maths	~~£7.95~~
Killer Gorilla	~~£7.95~~
Bandits at 3 O'Clock	~~£7.95~~
Stock Car	~~£7.95~~
Positron	~~£7.95~~
Fat Man Sam	~~£9.95~~
Star Driller	~~£9.95~~
Microcosm	~~£9.95~~

ANY FIVE FOR ONLY £7.95! (Cass only)

EDUCATIONAL SPECIALS

Linkword Spanish
Linkword Italian
Maths 'O' Level 2
Biology
English
World Geography (BBC Only)
European Knowledge
Graphs & Charts
Business Games
Talk Back
Workshop

ANY 2 FOR £3.95! Cass Only

ACORNSOFT SPECIALS

Crime & Detection
Music Quiz
Theatre Quiz
Sci Fi Quiz
Dating Game
Royal Quiz
Spinx Adventure
Crazy Tracer
Castle of Riddles
Starship Command

ANY 5 FOR £7.95!

NEW Thomson NEW
12" High Resolution
Green Screen
MONITOR
Only £69.95!
BBC or Electron lead FREE!

Rediffusion
TV TUNER
Turns your monitor into a TV!
* Push Button Control
* 7 Channel Option
(works with any monitor with a composite video input)
Only £49.95!

MITSUBISHI
DISC DRIVE
400K, DD, 40/80T, Warranty
ONLY £139.95

RECENT RELEASES AT SPECIAL PRICES

	BBC or ELE	BBC Disc	BBC Comp.
Acornsoft Hits 1	4.95	9.50	11.50
Acornsoft Hits 2	4.95	9.50	11.50
Barbarian	7.45	9.50	11.50
Bonecruncher	7.45	9.50	11.50
Breakthrough	7.45	9.50	11.50
Codename Droid	7.45	9.50	11.50
Crazee Rider	7.45	9.50	11.50
Elixir	7.45	9.50	11.50
Impact	7.95	9.50	–
Kourtyard	7.45	9.50	–
Life of Repton	5.50	6.50	7.95
Palace of Magic	7.45	9.50	11.50
Pipeline	7.45	9.50	11.50
Play it Again Sam	7.45	9.50	11.50
Play it Again Sam 2	7.45	9.50	11.50
Quest	7.45	9.50	11.50
Skirmish	7.45	9.50	–
Spellbinder	7.45	9.50	11.50
Spy Cat	7.45	9.50	11.50
Spy vs Spy	7.45	9.50	11.50
Strykers Run	7.45	9.50	11.50
Superior Collection 1	7.45	9.50	11.50
Superior Collection 2	7.45	9.50	11.50
Superior Collection 3 (Ele)	7.45	9.50	11.50

LOOK! **ELECTRON POWER SUPPLIES–Only £9.95**

MICROPOWERS
CASTLE QUEST
BBC
Cass £5.95 Disc £7.95

LOGO
For Master 128 or Ele Plus 1
ONLY £24.95

LISP Rom (Ele) £9.95
LISP Cass (Ele) £2.95

- * Please add 95p P&P (Overseas £4.50).
- * All prices include VAT
- * Goods despatched within 48 hours – subject to availability
- * Out of hours answerphone; 0532 687735

SOFTWARE Bargains

Dept. MU11, 8, 8A Regent Street, Chapel Allerton, Leeds
LS7 4PE. Tel: 0532 687735 or 0532 687789

VISA

We can offer attractive discounts for all educational establishments, phone or write for a quote.

We supply a catalogue of our entire stock range per machine type with every order.

Vine Micros Ltd

See us
at the
New Hoticultural Hall
London
Nov 11-13
1988

Replay

The Ultimate in Tape to Disk Transfer.

Features Include

- Very fast saving and loading of files
- No soldering or track cutting required
- Saves up to 22 files per disk
- Fully menu driven
- Money back guarantee if not satisfied

BBC Master Self Contained	**£35.00**
BBC Master Add on for Romboard 3	**£27.00**
BBC B Mk1 (please state DFS)	**£29.90**
BBC B Mk2 (for any 1770 DFS)	**£29.90**

Mk 2 additional features include:
Built in Formatting, Auto file creation.

Master to B Conversion

For those who have upgraded from a B to a Master, to enable most old cassettes to be used. **£14.95**

B+ to B Conversion

Enables you to switch between OS 2.00 on B+ and OS 1.20 used by the B. **£14.95**

Write Protection Switch

Fits internally in the Master to write-protect sideways RAM, no soldering required. **£8.90**

Romboard 3 – for Master 128

Adds 3 extra ROM sockets

Works by replacing the computer's built-in ROM software with other ROMs (including the Inter-series from Computer Concepts. **£17.50**

Romboard 4 – for Master 128

Adds 4 extra ROM sockets plus a Read/Write protect switch

Supports up to 4 ROMs by overlaying either RAM banks or cartridge slots. **£26.50**

ADDCOMM – (not Master) details available

Provides 40 extra BASIC commands including Graphics, Toolkit, and other utilities. **£23.00**

Matrix ROM – (not Master) details available

Adds BASIC commands to enable matrix algebra in your own programs. **£26.00**

★ *All products fully documented*
★ *full backup services available*
★ *All prices include VAT and postage*

For details/orders contact:

Vine Micros Ltd.,
Marshborough
Sandwich, Kent. CT13 0PG
Telephone: 0304 812276

VISA

SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s

SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s

Don't dice with dodgy discs Buy top quality products from the Mail Order Specialists!!

!!! FLOPPY DISKounts!!! THE MORE YOU BUY – THE MORE YOU SAVE!!!

3.5" Bulk Packed–

Price each disk	25+	50+	75+	100+	150+
Single Sided 135 T.P.I.	82p	80p	78p	76p	74p
Double Sided 135 T.P.I.	84p	82p	80p	78p	76p

ALL DISCS ARE SUPPLIED WITH LABELS AND ARE CERTIFIED 100% ERROR FREE

5.25" Bulk Packed–

Price each disk	25+	50+	75+	100+	150+
Double Sided 48 T.P.I.	42p	37p	32p	30p	29p
Double Sided 96 T.P.I.	44p	39p	34p	32p	31p
Double Sided Col. 96 T.P.I.	53p	47p	43p	37p	36p
Double Sided Rev. 96 T.P.I	53p	47p	43p	37p	36p

ALL DISKS COME WITH ENVELOPE AND LABEL SET AND HAVE A HUB RING AND FULL GUARANTEE

3.5" Lockable Disk Box Prices

	1	3	5
40	£5.49	£15.99	£24.99
80	£6.49	£18.99	£29.99
120	£8.49	£24.99	£39.99

ACCESSORIES

Mouse Mat	£4.95
BBC Printer Cable	£5.95
Atari etc Printer Cable	£6.95
3.5" Cleaning Kit (fluid)	£4.95
5.25" Cleaning Kit (fluid)	£3.95
Disk Notcher (doubler)	£4.95

Space Saver
Printer Stand
(80 col)
£23.95

5.25" Lockable Disk Box Prices

	1	3	5
50	£5.49	£15.99	£24.99
100	£6.49	£18.99	£29.99
140	£8.49	£24.99	£39.99

20 Double Sided 3.5" 135T.P.I. Disks with our storage box	£22.95
40 Double Sided 3.5" 135T.P.I. Disks with our storage box	£38.95
60 Double Sided 3.5" 135T.P.I. Disks with our storage box	£52.95
80 Double Sided 3.5" 135T.P.I. Disks with our storage box	£69.95

You can choose either 40 capacity storage box or 80 capacity storage box to go with your discs. If you want a 120 capacity storage box just add a further £2.95

ALL BOXES COME WITH LOCK, 2 KEYS, DIVIDERS AND ARE ANTISTATIC.
ALL DISKS COME WITH LABELS AND ARE 100% GUARANTEED ERROR FREE

MOUSE BRACKET – £5.95

BRANDED 3.5" & 5.25" DISKS

Description	3M	Athana	Sony	Verbatim
3.5" Single Sided 135TPI	£14.95	£12.95	£14.95	£13.95
3.5" Double Sided 135TPI	£16.95	£15.95	£16.95	£17.95
3.5" Double Sided 2Mb	£37.95	£32.95	£39.95	£39.95
5.25" Single Sided 48TPI	£9.95	£8.95	£9.49	£9.95
5.25" Double Sided 48TPI	£11.95	£10.95	£11.95	£11.49
5.25" Double Sided 96TPI	£15.49	£14.95	£16.49	£15.95
5.25" Double Sided H.D.	£19.95	£17.95	£18.95	£18.95

We have a large stock holding of branded products in our warehouse. All disks are supplied in boxes of 10. We also stock Data cartridges, please phone for a quote!

25 Double Sided 5.25" 135T.P.I. Disks with our storage box	£11.50
50 Double Sided 5.25" 135T.P.I. Disks with our storage box	£17.50
75 Double Sided 5.25" 135T.P.I. Disks with our storage box	£22.50
100 Double Sided 5.25" 135T.P.I. Disks with our storage box	£28.50

You can choose either 50 capacity storage box or 100 capacity storage box to go with your discs. If you want a 140 capacity storage box just add a further £2.95

All Disks are sent by Trackback or Courier Service at no extra cost!

MELTON COMPUTER SUPPLIES

PO Box 2, Melton Mowbray, Leics. LE13 1YG
Tel: 0664 410666 (24 hrs). Fax: 0664 410221
Phone for our best price before placing your order
EDUCATIONAL & GOVERNMENT ORDERS WELCOME

VISA

10 Sony
MF2/DD
£16.95

E&OE **Remember the price you see is all you pay (U.K. only). Prices include VAT and carriage**

SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s SAVE ££££'s

The book of the micro

Steve Turnbull evaluates the latest addition to his library

Product: The Complete BBC Computer User Handbook
Price: £14.95
Supplier: Watford Electronics, Jessa House, 250 High Street, Watford, WD1 2AN.
Tel: 0923 37774

BOOKS on how to program in Basic are available by the busload, ones on the BBC Micro are ten-a-penny. So I didn't greet the prospect of yet another on the Acorn series of micros with much enthusiasm, just how different could it be to the ones we already have? Well, my jaded palate has been very pleasantly surprised by this new book from Watford Electronics.

The introduction describes it as "intended...to plug the gap between beginner and expert" and it certainly seems to do it. The first chapter covers the uses of a micro and works through game playing, comms, control applications to music, desktop publishing and programming. In each it describes how a micro can help – although it doesn't say much about the drawbacks in each area.

From there the authors move to how to set up your system for maximum comfort, including health and safety considerations – there's even a diagram of the ideal set-up. Moving on, hardware, compatibility and useful roms are gone into in a fair amount of honest detail – and Watford Electronics products are not always the ones recommended.

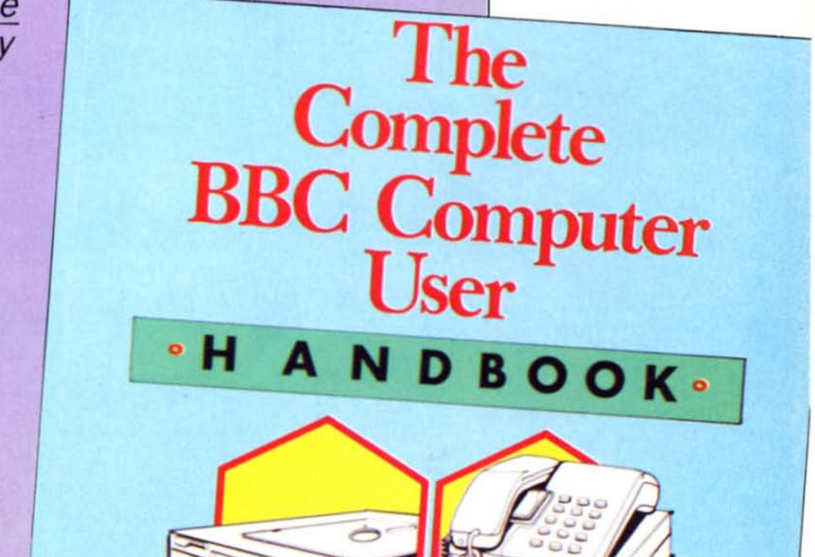
There is a chapter on the Archimedes which examines the hardware and software compatibility with the earlier machines, plus detail on its unique features. The only problem here is that some of the popular myths about the 32 bit micro are set out as enthusiastic facts.

The next three sections cover organising yourself for work on a micro, tips on programming and how to debug successfully. For me these were the most enlightening parts of the whole book: No matter how experienced a programmer you are, you'll find things here you've never thought of – although they're obvious when pointed out.

The final few chapters deal with commercial software, using your micro for work, computer law and how to sell your own programs. Each one has sufficient depth to make it interesting even to the expert, but is simple enough for the beginner to understand.

The author's style throughout is friendly and interesting with jargon kept to a minimum and explained where it does crop-up. Each chapter is composed of short sections seldom more than a page in length which are self-contained and easy to absorb. There are plenty of examples and short routines to demonstrate points as they are made – this *is* a book you can read sitting at your micro.

All in all it's excellently written, well produced and the perfect complement to your BBC Micro.


The Complete BBC Computer User
HANDBOOK
by Dr. John Lockley & Douglas Tate

GENERAL FEATURES

ARM Wrestling
Archimedes (Acorn launch)
Overview of Computer Education
C Programming
Now C Here (Part 1)
Comms Problems
Intelligent Modems
Exploring Assembler
Introduction to Assembly Language
Animation
Colouring your Beeb Pt.2
Sideways and Shadow RAM
Animation (Trench)
Giant Bounce
Giant Scroller

60 In Depth Editorial Features

PROGRAMS : Applications

Chart Recorder
Circuit Analysis
Ghost Host (Bulletin Board)
Keystrip Generator
Marks Analysis for Teachers
Personal Appointments D
inting and Transpos
or Calculation
Video Cassette Cataloguer Pt.1
World by Night and Day

Over 60 Programs that you can type in (or load from disc/tape) ranging from a Full Screen Editor to a Bulletin Board.

REVIEWS : Books

Books for Serious Users
Master Operating Sys. (DABS Press)
The New Advanced User Guide (Adder)
Books for View
A Dabhand Guide (DABS Press)
Mastering View (Sigma Press)
Computing without Programming
The C Programming Language
The Recursive Universe

BEEBUG

The latest News from Acorn and other major suppliers.

The Magazine For BBC/Master/Compact Users Is Now In Its 7th Year

REVIEWS : Software

InterBase (Computer Concepts)
Master Emulation ROM (DABS Press)
PCB Autoroute (Pineapple Software)
PrintROM (Windmill Software)
Realtime Solids (Silicon Vision)
View Professional (Acorn Computers)
Word Power (Ian Copestake Software)
ADU ROM (Pineapple Software)
Acornsoft C (Acorn Computers)
Diagram II (Pineapple Software)
Fontaid (CJE Micros)
Genie (PMS)

PROGRAMS : Utilities

ADFS Menu for View
Animated Titling
DFS Utilities: *FREE and *MAP
Epson Character Definer
Function Keys
IBM to BBC Transfer Utility Pt.1
MIDAS Universal Disc Front End
Machine Code Cross Referencer
Mode 7 Menu Generator
Overlaying Techniques
Procedure and Function Analyser
RAM (Vectored Entry into)
ROM Controller (Improvements)
ROM Filing System Image Generat
Screen Dump for Mode 0

This is just a small sample of the items featured in Volume 6

REVIEWS : Hardware

Music 400 (Hybrid Technology Ltd)
Pearl 8000 Data Logger (Innovations)
Quest Mouse (Watford Electronics)
Real Time Clock (Solidisk)
Z88 (Cambridge Computers)
Archimedes A440 (Acorn)
Co-Processor (Watford Electronics)
Hard Disc (Technomatic)
Linnet Modem
Series Four Modem
Master Cartridges

A Whole Host Of Reviews, covering the latest Software, Hardware, Books and Games.

GENERAL : Hints

InterWord and Long Commands
Dates in Wordwise
Self Destruct Function Keys
Crosswords with Spellmaster
Two Programs in Memory at Once
InterWord Multi-File
Giant Scroller
Protecting Basic Programs
Getting Input
Memory and DATA Statements
Determining the Current Mode
Miniature Disc Labels
Two ROM Images in one EPROM

More that 90 Hints and Tips on using the BBC/Master.

Can you afford to miss this Best Seller

Subscribe Now For Only £14.50

– You Will Be In The Good Company Of 20,000 Others

BEEBUG is published 10 times a year and is only available on subscription, not through the shops.

1 Year UK, BFPO & Channel Islands	£14.50
Europe & Eire	£20.00
Middle East	£25.00
America & Africa	£27.00
Elsewhere	£29.00

I would like to subscribe to BEEBUG

and enclose a cheque for £ ________
Official Orders Welcome
Please debit my Access/Visa/Connect account with £ ________
Card Number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Expiry ____ / ____

Name ________________
Address ________________
____
________________ MU11

Access/Visa/Connect card holders may alternatively call our 24 hour hotline on 0727 40303.
All cheques must be in pounds sterling drawn on a UK bank.

Post To:
BEEBUG, Dolphin Place, Holywell Hill, St. Albans,
Herts. AL1 1EX
For a Free BEEBUG Information Pack Phone 0727 40303

Big alpha for Delta

Don Turnbull puts a five-pack suite of software to the test

Product: System Delta Accounts
Price: £280 or £64.95 each
Supplier: Minerva, 69 Sidwell Street, Exeter EX4 6PH.
Tel: 0392 37756

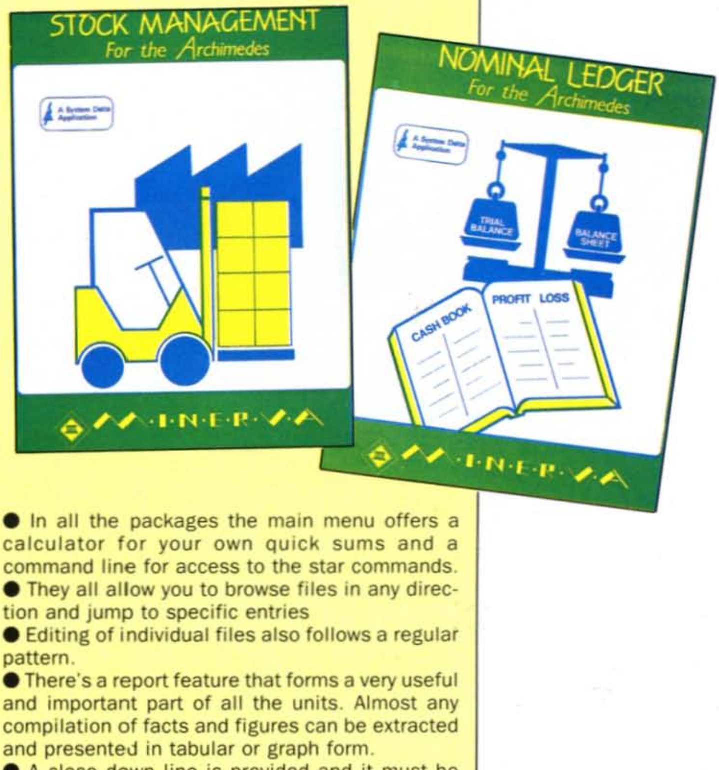
THE System Delta Accounts packages are a set of programs that cover Order Processing/Invoicing, Sales Ledger, Stock Management, Purchase and Nominal Ledger. They take full advantage of the Archimedes' environment and are presented in a straightforward way, but ideally require a basic knowledge of these aspects of business management.

Much time and attention has been given to them to ensure that these very professional business packages are right. It's not unreasonable to assume that Minerva's System Delta output is aimed, in part at least, at companies and individuals who can see the advantages of moving away from time-consuming manual book-keeping methods to easier and more flexible micro-based systems.

However, the presentation of these particular products is such that even a novice in business matters could successfully run the parts he understands and gradually improve his ability to use more and more of the elements provided.

Very often the key to successful utilisation of a new system is the accompanying manual, and those supplied with each of these packages are very good indeed. This is a real plus point for tackling a micro business system for the first time and it's good to see Minerva making progress on this front. The only area of difficulty lies in the fact that the manual is for the BBC Micro version plus an amendment sheet for the Archimedes, so anyone unfamiliar with the earlier machines could find the references confusing.

Moving on to the software, as you might expect in a suite of utilities like this, there are actions and operations which recur throughout – making comprehension much easier once you have been through the process the first time. The principal elements common to all the packages are:



- Entering the system. Insert disc, boot and respond to the request for the date by entering your own figures or accepting the current – default – date conveniently provided by your Archimedes. You are then given the chance to clear out old data and taken to the main menu.
- In all the packages the main menu offers a calculator for your own quick sums and a command line for access to the star commands.
- They all allow you to browse files in any direction and jump to specific entries
- Editing of individual files also follows a regular pattern.
- There's a report feature that forms a very useful and important part of all the units. Almost any compilation of facts and figures can be extracted and presented in tabular or graph form.
- A close down line is provided and it must be used to enable the program to tidy up and leave the files in good order for subsequent use.

We can't possibly examine all of the packages in detail, and given the many points of similarity it's hardly necessary. So let's look at one program in detail.

Order Processing and Invoicing

From the main menu selecting the first item – Orders/Invoices – reveals a screen showing the date, order or invoice number and the main working area. The document itself can be larger than the work area and as you move around it – using the cursor keys – hidden sections appear

Turn to Page 54 ▶

◀ From Page 53

> *Minerva can look forward to much wider use of these efficient business tools*

and screen update is extremely fast. Using Shift with the cursor you can scan through all the invoices in the file.

On the default invoice all the usual invoice/order conventions are observed: Date, number, discount rate and so on. Although it has a very practical layout and simple modifications will customise it for your own use – you can devise your own invoice – which becomes the default – complete with its own discount tables.

You can start a new invoice either from the main menu or by pressing Control+A elsewhere. The system takes you logically through the name and address sequence – you can have both account and cash customers and with the former the program will find the address for you. You can also set up an overall discount or discount code to be entered automatically on each line.

Complex discount structures can be a problem, but with this system you can have a great variety of them already set up, only requiring a code to specify the right one – but you can also override the standard ones if you want to.

Once you've finished entering the order you have the opportunity to add postage and packing, then the finished invoice is automatically printed – something you'll always want to do when it's complete. In contrast to an invoice, you can also create a credit note using the same basic form.

All the programs in the Minerva suite can be integrated, and if you have this unit tied in with the stock control the actual entry of transactions becomes very simple. You just type in the product code then its description and price are automatically placed in the appropriate places and you only need check off the quantity and discount code before moving to the next entry.

Account and Cash files are two useful adjuncts to the action of raising invoices and orders. The former holds the frequently used addresses and the other keeps track of one-off addresses, perhaps for use in a mailshot.

There are other very useful files in this versatile package: Archive keeps track of all transactions that have passed through the system even after invoices have been removed. Linking to the Stock Management system allows stock levels to be updated whenever something has been ordered and provides much more sophisticated and versatile stock control.

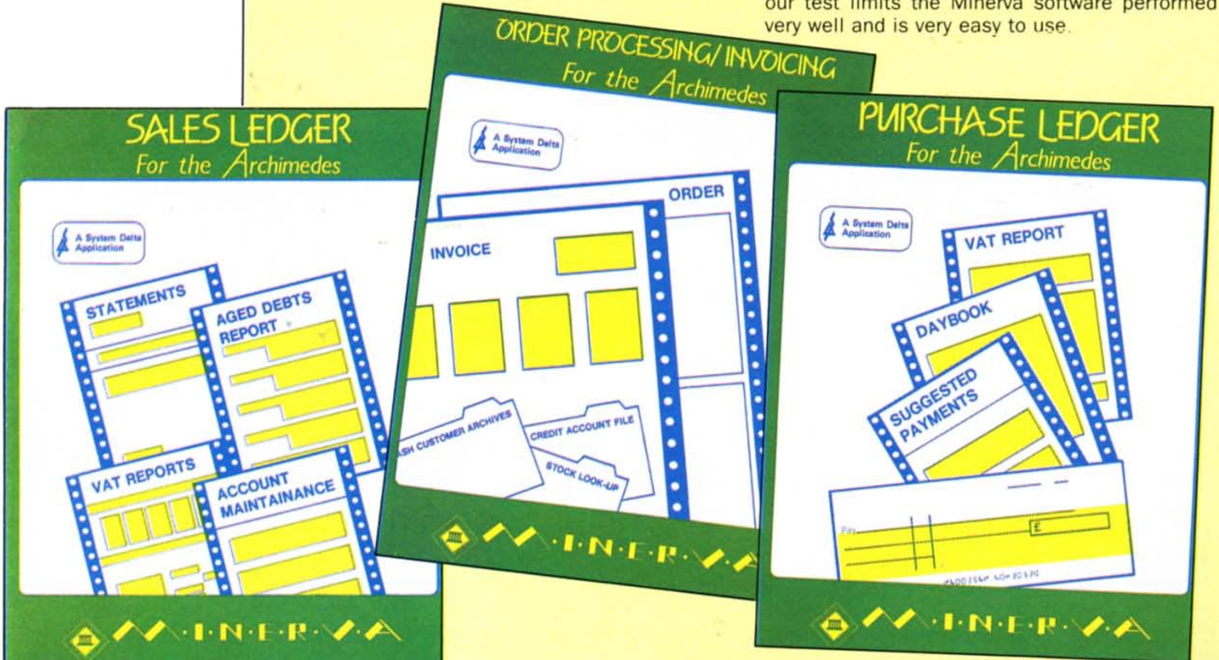
It's also possible to integrate the Order/Invoice package with the Sales Ledger. A restriction here is that where more than just a few small accounts are to be handled – and linked with other ledgers – twin disc drives or a hard disc become a necessity.

Although supplied individually the units are designed to work together and with the System Delta Plus – reviewed in the December 1987 issue of *The Micro User* – where the business environment in which they are used requires it. As with other Minerva packages they represent a very useful addition to the growing library of Archimedes programs.

Recent promises from Acorn's new chief executive that the company plans to break into the business market, if realised, mean Minerva can look forward to seeing much wider use of these fast, efficient and well-constructed business tools.

Current government plans enable headmasters to control school finances and purchases directly. With the majority of educational establishments already equipped with BBC Micros it is quite possible that these packages will be taken up more rapidly by schools than by the business community at large.

The majority of powerful business packages for micros can only be fully appreciated by running them within the office environment where they are to be used on a day-to-day basis. But within our test limits the Minerva software performed very well and is very easy to use.



MUG

THE INDEPENDENT MicroLink User Group NEWSLETTER

Online Magic

ANOTHER new service for MicroLink subscribers is the Shades multi-user game. It's similar to standard computer adventure games, where the player wanders a fantasy land killing gnomes, gathering treasure and rescuing maidens, but with the added advantage that the user can talk, co-operate with or slay other players. By dint of determined playing, people can build up points and status in the game, acquiring skills and magic as they go.

And as it's available from many other Telecom Gold systems, there can be some strange characters about.

Strike? What strike?

AS the rest of the country got used to empty doormats during the recent postal strikes, MicroLink and its users were making the most of the situation. Electronic communications, quicker than snail mail at the best of times, came into its own.

Three things happened to enhance this. Firstly, the allocation of personal telex numbers is well underway. Before this, all telex users had to share a communal number with their mailbox ID being quoted – non-standard and prone to confusion. Now they can have an individual number with their own answerback code, enabling them to use MicroLink exactly as they would a telex machine. There have been some delays in the introduction of this service, but the users say it's worth the wait.

Secondly, there's a bounty of £10 payable to any MicroLink subscriber who recruits a new user. There's quite an opportunity here for any latent salespersons – it doesn't take long to set up a demonstration at work or home, and everyone knows that electronic mail (email) really gets going when all your friends are on it.

Lastly, MicroLink has announced the availability of a fax service for all subscribers and offers the chance to send text from a computer to up to 50 fax machines simultaneously. At the moment, there's no mention of fax reception or graphics, but the technology's there.

MUG meetings

TALKING of strange characters, the first of what promises to be many meetings was finally arranged between regular MicroLink bulletin board users. It was interesting to put faces to regular correspondents, and the conversation flowed freely into the night, unhindered by connect charges or telephone bills.

More are planned, most in London but with some interest being shown in more northerly venues. Everyone who attended the first agreed it was a success, and some of the later events will probably go down in MicroLink folklore.

As mentioned in previous news pages, the best way to find out when the next one will happen is to ask on the CHATTER or MUG sections of the MicroLink bulletin board (key BB at the > prompt), or send a message to MAG95816. As it doesn't take long to arrange such things by electronic mail, and as anyone can suggest a time and place, out-of-town MicroLinkers who would like to take the opportunity to meet some fellow users are welcome to mention that they're passing through London. We'll do our best to be there!

Show business

MICROLINK was at the recent PC Show in Earl's Court, London, sharing a stand with several other tentacles of the Database empire. As well as the chance this afforded for users to meet some of the MicroLink officials, the hot news from the various new product launches was available on the system within hours of it happening. Subscribers were among the first people in the UK to read a detailed account of the many new Amstrad computers, followed up by information gathered from Amstrad technical staff themselves.

People at the show also took advantage of the computers and modems liberally sprinkled about the place to post items of news on the bulletin board, which gave those who couldn't (or didn't want to) go the chance to find out what was happening and get questions relayed to the exhibitors. Useful, and organised entirely by subscribers. Hopefully the exercise will be repeated at future computer (and maybe more general interest) events.

Patter of tiny hooves

IN another attempt to bring the entire range of human activity to the keyboard, MicroLink is offering various information services to the data-hungry. For the sports fan who is not satiated by the meagre coverage of the Olympics on television, newspaper and radio, a link to a computer in Seoul provides results as they happen. There could well be a serious use here, for people who want to record results in computer-readable form.

Turfnet should be a more durable service. It provides accurate tips and data on form for those who enjoy a flutter on the horses. MicroLink is quick to point out that the information available in this way is 24 hours ahead of that published in the sports pages of the national press, and consequently better able to cope with weather changes or equine sickness.

Bits...

BY special arrangement with MicroLink and Telecom Gold, a business sent a telex to 2,500 addresses in only three goes: Two of 1,000 addresses and one of 500. This might well be a record, and certainly beats typing the thing in thousands of times on a conventional machine....

* * *

FOR those not totally converted to the pleasures of the modem and with a memory capable of remembering the days when there was a reliable postal service MicroLink now offers an online postage rate calculator. By keying in the weight of a package and the class (first, second, surface or airmail), the cost of postage can be obtained. Since at that point the user is logged on to MicroLink anyway, it is a simple matter to also send an Email message to the recipient warning him that sometime in the next six months a package will arrive...

Suggestions of material for inclusion in the MUG Newsletter should be sent to Rupert Goodwins on MAG95816

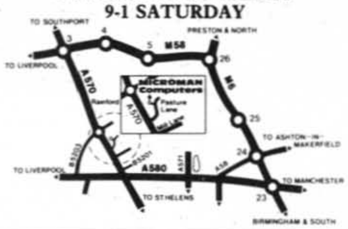
MICROMAN Computers

PASTURE LANE FARM,
PASTURE LANE, RAINFORD,
ST. HELENS, MERSEYSIDE, WA11 8PU

PHONE 074488 3667

SHOWROOM

SHOWROOM OPENING
9-6 MONDAY TO FRIDAY
9-1 SATURDAY



MAIL ORDER

PHONE 074488 5242

We accept both Access and Visa credit cards. Simply telephone your order, giving card number, expiry date, name and address, or send your order with cheque or postal order to the address opposite.

DELIVERY CHARGES
INCLUDING VAT

Computers/Printers/Drives:
Next day £8.00, Trackback £4.00
Small Items: £1.00

ACORN DEALER : ECONET : SERVICE CENTRE

Archimedes

ARCHIMEDES 300 SERIES	Ex VAT	Inc VAT
Archimedes 305 Base	699.00	803.85
Archimedes 305 Mono	759.00	872.85
Archimedes 305 Colour	919.00	1056.85
Archimedes 310 Base	835.00	960.25
Archimedes 310 Mono	895.00	1029.25
Archimedes 310 Colour	1055.00	1213.25
Archimedes 310M Base	895.00	1029.25
Archimedes 310M Mono	955.00	1098.25
Archimedes 310M Colour	1115.00	1282.25

ARCHIMEDES 400 SERIES		
Archimedes 440 Base	2529.00	2908.35
Archimedes 440 Mono	2589.00	2977.35
Archimedes 440 Colour	2749.00	3161.35

ARCHIMEDES SPECIAL PACKS

ARCHIMEDES 310 COLOUR
FREE
Archimedes 5.25/3.5 Disc Interface
PC Emulator

ARCHIMEDES 440 SERIES
FREE
Archimedes 5.25/3.5 Disc Interface
PC Emulator
5.25 Disc Drive + PSU

ARCHIMEDES ON-SITE SERVICE

Phone for full information sheet

MUTISYNC MONITORS		
NEC Multisync 2	520.87	599.00
Taxan 770 Plus	599.00	688.85

ARCHIMEDES UPGRADES		
0.5 MB RAM (305 only) *	149.00	171.35
Floppy Disc Drive *	115.00	132.25
20MB Hard Disc *	499.00	573.85

(Requires Backplane Podule)
* Dealer Upgrade Only

ARCHIMEDES PODULES/EXPANSION		
Acorn Backplane Podule	39.00	44.85
Acorn I/O Podule	85.00	97.75
Acorn ROM Expan Card	59.00	67.85
CC ROM Podule	49.00	56.35
CC ROM Podule + BB	59.00	67.85

ARCHIMEDES SOUND SYSTEMS		
Acorn MIDI Add-on to I/O	39.00	44.85
Acorn MIDI Expansion Card	69.00	79.35
EMR Sound Synth	43.44	49.95
Armadillo Sound Sampler	110.00	126.50
Sound Sampler + FFT	140.00	161.00
FFT Software	40.00	46.00

ARCHIMEDES 5.25/3.5 DISC INTERFACE

Microman has produced an interface for the Archimedes which supports up to four drives in any internal or external combination and provides priority switching. It is fully buffered and does not restrict the number of podules which can be fitted to the Archimedes.

25.00 Ex VAT **28.75** Inc VAT

ARCHIMEDES LANGUAGES		
Ansi C	99.00	113.85
ISO-Pascal	99.00	113.85
FORTRAN 77	99.00	113.85
PROLOG	199.00	228.85
LISP	199.00	228.85
Twin	29.95	34.44

ARCHIMEDES PIPEDREAM

99.00 Ex VAT **113.85** Inc VAT

Archimedes Pipedream is file compatible with Z88 and PC Pipedream, the Z88 computer is an ideal companion to the Archimedes as a personal organiser when travelling.

Z88 COMPUTER		
Z88 Computer	239.00	274.85
Mains Adapter	8.65	9.95
128K RAM Pack	43.44	49.95
128k EPROM Pack	43.44	49.95
Z88 PC Link II	30.39	34.95
Z88 BBC Link	21.70	24.95

ARCHIMEDES APPLICATIONS		
PC Emulator	99.00	113.85
1st Word Plus	79.00	90.85
Logistix	99.00	113.85
Sigma Spreadsheet	60.83	69.95
Minerva Deltabase	26.04	29.95
Minerva System Delta Plus	60.83	69.95
Clares AlphaBase	43.44	49.95
Clares Graphic Writer	26.04	29.95

ARCHIMEDES GRAPHICS		
Clares Artisan	34.74	39.95
Clares Artisan Utilities	17.35	19.95
Timeworks	Coming Soon	

ARCHIMEDES UTILITIES		
Clares Toolkit Module	34.74	39.95
U Connect	52.13	59.95

AUTOSKETCH

79.00 Ex VAT **90.85** Inc VAT

AUTOSKETCH is a precision drawing package with a friendly appearance that makes it particularly well-suited to the beginner or occasional user. At the same time it has great "depth" and provides many features of a two-dimensional CAD package. The files are upward compatible with AUTOCAD Autodesk's full 3D CAD package for PC computers and workstations.

Microman Computers are an AUTHORISED AUTOCAD DEALER for full details of all AUTODESK PRODUCTS for Education and Business please contact Kevin Shave.

ROLAND PLOTTERS	Ex VAT	Inc VAT
DXY880A A3	591.30	680.00
DXY1100 A3 - NEW	713.04	820.00
DXY1200 A3 - NEW	956.52	1100.00
DXY1300 A3 - NEW	1129.57	1299.00
DPX2200 A2	2999.00	3448.85
DPX3300 A1	3999.00	4598.85
GRX 300 A1 - NEW	3999.00	4598.85
GRX 400 A0 - NEW	5800.00	6670.00

BBC MASTER 128		
Master 128	379.00	435.85
Master Turbo Module	120.00	138.00
Master 512 Upgrade	99.95	114.94
Microman 512 Disc Utils	11.26	12.95

BBC B/B+ UPGRADES		
Acorn 1770 Disc Interface	49.00	56.35
Acorn ADFS ROM	26.08	29.99

DISC DRIVE SPECIAL

5.25 40/80T 400K (640K ADFS)
DISC DRIVE

65.00 Ex VAT **74.75** Inc VAT

BBC MONITORS		
Philips CM8833	239.00	274.85
Philips Green 7502	73.00	83.95

WATFORD PRODUCTS		
Solderless ROM Board	32.00	36.80
ROM/RAM Card + 32K	39.00	44.85
ROM/RAM Card + 64K	52.00	59.80
ROM/RAM CARD + 128K	80.00	92.00
32K Shadow RAM Board	59.00	67.85

CONCEPT KEYBOARDS		
Concept Keyboard A4	115.00	132.25
Concept Keyboard A3	146.50	168.48

PRINTERS		
New Star Prices		
Star LC-10	189.00	217.35
Star LC-10 Colour	233.00	267.95
Star LC24-10 24 Pin	329.00	378.35

For our full ARCHIMEDES, MASTER, BBC and PC price list please phone.

GOVERNMENT, NHS AND EDUCATIONAL ORDERS ACCEPTED

Innovations to the rescue

BBC Micro users have put the time since the last Innovation Awards to good use to judge from the number of entries received for this year's contest. Unsurprisingly, the majority of entries came from BBC Micro rather than Archimedes users, but there was no shortage of novel ideas and applications in both categories – some of which are briefly highlighted here.

In a category by itself is Mike Topping's robotic feeding aid designed for the severely disabled, the elderly and people in hospital – an invention he developed entirely on his BBC Micro. Controlled by touch, body pulses, head, foot or even eye movement, Mike's invention employs a computer-driven robot arm to select food from a plate and spoon it into the user's mouth.

Disabled himself, Mike was made redundant some eight years ago and has put his time to good use – graduating in Computer Science from Keele University and committing himself to his robot arm brainchild.

The user can treat the arm as an extension of himself, which Mike sees as its main feature. "My intention through it all is to help other disabled people worse off than me to get over the indignity of having to be fed by others", he says.

The prototype equipment used either a BBC Micro or Master, and the language used to program the robot is Acornsoft Forth. Mike chose the BBC Micro to develop his project because it is the main computer used in special education.

And while numerous different interfaces between user and robot can be used, Mike – prompted by the constraints of time and cost – used Concept and expanded keyboards in his prototype. The original cumbersome configuration of micro and peripherals has now been condensed into a single, easily portable box about 10in square containing a BBC Euro Board.

Considerable interest has already been shown in Mike's project and he's optimistic of finding a sponsor to take his idea further.

Using a BBC Micro to drive an ancillary piece of equipment occurred to several entrants, including Jonathan Pickard from Harrogate who's successfully hooked a BBC Micro to a Ricoh photocopier. The micro is in complete control – the copier can only be activated by a signal from an intelligent interface, which also translates pulse signals from the copier to the computer so that it can count the number of copies going through the machine.

The result? No unauthorised use of the copier and an accurate record of work done – 16k of battery-backed sideways ram is used to store transaction information, along with passwords.

The combination is currently in use at Harrogate Grammar School – and the profit margin on copying has dramatically increased as a result.

Handicapped Peter Higginbottom can now feed himself with this robotic arm, an Innovation Awards contender

The BBC Micro has a place in the medical world too. P.J. Whyer, from High Wycombe drew on the power of a BBC Master to release staff from some of the chores attendant on data handling in hospital pathology departments.

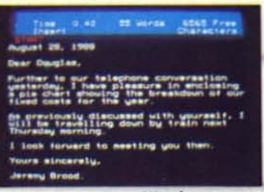
It's essential to have detailed and accurate records of blood and blood products with which a patient may have been transfused – but the time spent on providing this information could be more usefully used on investigative work.

Existing software is geared to the demands of American users and is thus unsuitable, so Mr Whyer designed a versatile system to cope with British requirements – one capable of handling 18,000 patients. Patients' blood samples are given a laboratory number, and any patient's details – such as blood group and antibody status – can be instantly accessed from the file by number or name.

The blood and blood products file presently may contain 30,000 entries with similar instant access, but the only limit on entries is disc size. Printed reports are produced for issue to the wards, together with identifying compatibility labels to attach to the blood. A continuous record of the associated laboratory work is concurrently made.

The system uses a BBC Master 128 with 20Mb Winchester hard drive and a medium definition colour monitor. The colour provides an added safety factor and immediately displays potential incompatibility – a situation which can be lethal.

THE winners of the 1988 Micro User Innovation Awards will be selected and announced at the November Electron & BBC Micro User Show in London. Entrants concerned that their submissions might not have arrived in time thanks to the recent postal dispute can relax – the closing date has been extended to October 28 to catch last minute entries.



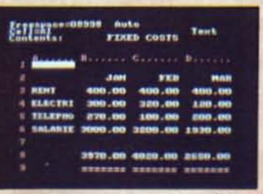
```
Time    0.42    55 Words    6565 Free
Insert                      Characters
August 28, 1988

Dear Douglas,

Further to our telephone conversation
yesterday, I have pleasure in enclosing
a pie chart showing the breakdown of our
fixed costs for the year.

As previously discussed with yourself, I
will be travelling down by train next
Thursday morning.

I look forward to meeting you then.

Yours sincerely,

Jeremy Brood.
```

Word processor

BBC version

Database

C64 version



```
FIXED COSTS

           JAN       FEB       MAR
RENT     400.00    400.00    400.00
ELECTRI  300.00    320.00    120.00
TELEPHO  270.00    100.00    200.00
SALARIE 3000.00   3200.00   1930.00

        3970.00   4020.00   2650.00
```

Spreadsheet

Amstrad version

mini
OFFICE
II
Commodore 64/128
(disc)
WORD PROCESSOR
DATABASE
SPREADSHEET
LABEL PRINTER
GRAPHICS
COMMUNICATIONS
DATABASE SOFTWARE

Six modules in one powerful package ...at a price that can't be matched!

Rent
Telephone
Salaries
Postage
Carrier
Others

Graphics

C64 version

Mini Office II
Label Printer

Label printer

Amstrad version

Communications

Atari version

Mini Office II is the highly-acclaimed, award-winning suite of integrated programs which will turn your computer into a versatile business machine.

Look at some of the tasks you can perform with the six separate modules:

- Compose a letter with the **WORD PROCESSOR.** Set the printout options using embedded commands or menus and use the mail merge facility to produce personalised circulars.
- Build a versatile card index with the **DATABASE.** Use the flexible printout routine, do powerful multi-field sorting, perform all arithmetic functions and link with the word processor.
- Design the layout of a label with the easy-to-use **LABEL PRINTER.** Select label size and sheet format, read in database files and print out in any quantity.
- Prepare budgets and tables with the **SPREADSHEET** module. Total columns and rows with ease, copy formulae absolutely or relatively, and recalculate automatically.
- With the **GRAPHICS** module you can produce pie charts, overlay line graphs and display bar charts side by side or stacked. Enter data directly or load data from the spreadsheet.
- Using a modem with the **COMMS** module you can access services such as MicroLink and order a wide range of goods from flowers to software, and send instant electronic mail, fax, telex and telemessages.

What the reviewers have said:

"Tremendous value for money and its current success is truly well deserved". – *Zzap 64*

"Little short of miraculous at the price". – *Acorn User*

"Makes some of its over-priced competitors hang their heads in shame". – *Commodore User*

Voted Business Program of the Year two years running in *Popular Computing Weekly*

It's no wonder that there are MORE THAN 400,000 satisfied users across the complete Mini Office range... the ideal package to increase your personal productivity.

Please send me Mini Office II on ☐ cassette ☐ disc for
.... (state machine)

☐ I enclose a cheque payable to Database Software

☐ Please debit my Access/Visa number:

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date: /

Signature..

Name..

Address..

....

.... Postcode..

DATABASE SOFTWARE

Available for:	Tape	Disc
BBC Model B, B+	£14.95	£16.95
BBC Master ...Compact (3.5")	– –	£19.95 £21.95
Amstrad CPC	£14.95	£19.95
Atari 48k	–	£19.95
Commodore 64	£16.95	£19.95

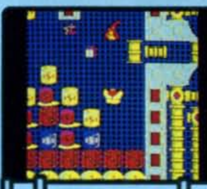
Send to:

Database Software,
Europa House,
Adlington Park,
Adlington,
Macclesfield SK10 4NP.

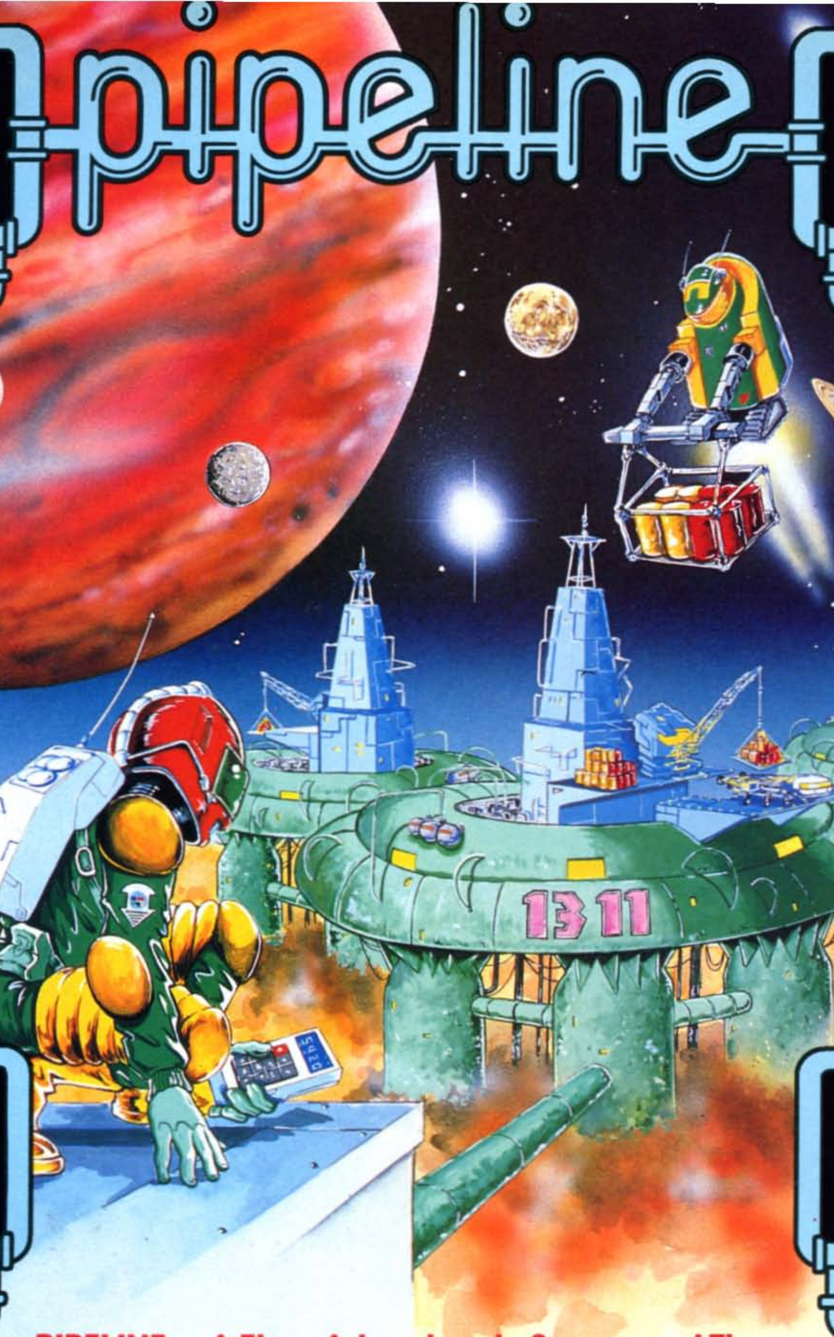
Enquiries: 0625 879940

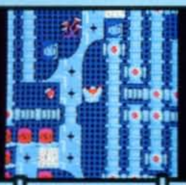
Order Hotline: 0625 879920

R219

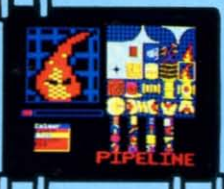


Beware of the fast-moving flame

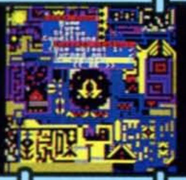




Trapped near a pipeline complex



The Character Designer



The Level Designer

PIPELINE — A Fiery Adventure in Space and Time

In the 25th Century, the Earth's supplies of sulphur had become so badly depleted that mining operations were established on Io, one of the moons of Jupiter. Following a volcanic eruption on Io, the robot-controlled extraction platforms have been engulfed in a burning sea of sulphur and are now malfunctioning.

You have been sent to the platforms in a single-handed, death-defying mission, to collect the precious drums of sulphur, close down operations and return to Earth. To complete your task, you must carefully weave your way through a complex series of pipelines in each of four platforms. But beware of the fast-moving flames and carnivorous plants!

Pipeline is a massive four level arcade-adventure, that combines the best features of a game like Ravenskull, with a novel pipeline system. Once you enter a pipe, there is no going back. You are carried past junctions, around bends and over other pipes, to be deposited at the end, wherever that might be.

In addition to an exciting, novel arcade game, Pipeline also includes a character designer and a very powerful level designer. Design your own level, including intricate puzzles and a vast array of pipeline complexes, and test your route through the pipes directly on the level design screen. With practice, you will soon be able to design complicated and highly unusual games.

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	BBC Master Compact 3½" Disc	£14.95

(Compatible with the BBC B, B+ and Master Series computers)

Please make cheques payable to "Superior Software Ltd".

PRIZE COMPETITION — DESIGN A LEVEL

If you complete Pipeline, you can enter our competition. To enter you should send in your score and submit a level design to Superior Software. Prizes of £100 each will be awarded for the highest score and the best level design. Books on astronomy will be awarded to 20 runners-up. Each prize-winner will also receive a signed congratulatory certificate. The best level designs may be used in a future Superior Software program.

Closing date: 31st January, 1989.

SUPERIOR SOFTWARE Limited

ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept P1, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: (0532) 459453.

The screen pictures show the BBC Micro version of the game.

Access VISA

24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

(This does not affect your statutory rights).

Archimedes
HARNESS THE POWER

TOOLKIT *Plus*

£49.95

The ARCHIMEDES TOOLKIT was the first toolkit for the Archimedes. It is still available for £39.95 but we have improved on the original with TOOLKIT PLUS. All of the previous favourites are there:

* 10 Fast memory and disc editors
* 8 Fast memory and disc searches
* Fast scrolling disassembler
* Memory shift, swap and compare

Plus

* AGET & APUT disc sectors
* FASTLOAD & FASTSAVE of screens
* A series of commands to list all SWIs, give SWI numbers for names and names for numbers.

Plus

A host of commands to search a disc for filenames including wildcards, specified filetypes, files between specific dates or a combination of these parameters, For instance you could search a disc for all BASIC files starting with DEMO and saved between 1/1/88 and 2/2/88.

Plus

ARCHIVING so that you can backup files matching the specified criteria above. You can then archive the files on your hard disc to floppies for safety.

You need TOOLKIT+ so order today.

BUFFER MODULE £19.95

Also from Mike Shaw, the author of Toolkit+, comes a buffer module. This has buffers for the printer, serial input and serial output, Each buffer can be configured form 256 bytes upto 1 megabyte. Whilst data is being printed you can carry on working on your computer.

You can get control back from your printer in a fraction of the normal time. Printouts that take a printer 4 or 5 hours to print can be put in the buffer in minutes and you can then carry on working on your computer. If yo want to save time get this module now.

Compatible with 305, 310, 410 and 440.

clares

98 Middlewich Rd
Northwich
Cheshire CW9 7DA
Tel: 0606 48511

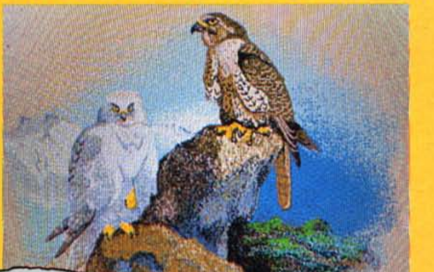
ALL PRICES INCLUDE
VAT and P+P
OVERSEAS ORDERS
ADD £4

DON'T FORGET, YOU CAN ORDER WITH ACCESS CARD TOO!

Artisan

£39.95

ARTISAN is not just an art package it is THE art package for the Archimedes. We are not going to bore you with lists of features, just take a look at the picture to see how good it is. Just to prove that we aren't the only ones who think its good take a look at what the magazines think:



> a sophisticated graphics package... **ARTISAN** is a true load and go program... A real first for **ARTISAN** is it's magic brush'. Its effects have to be seen to be believed... It's friendly and foolproof...**ARTISAN** operates at a lightning fast speed... It's streets ahead.
>
> *ACORN USER February 1988*

> **ARTISAN** makes the Archimedes superb... a truly professional product... The possibilities are endless. I can certainly recommend **ARTISAN**
>
> *MICRO USER January 1988*

> **ARTISAN** is a highly superior product... very classy... the manual clearly explained all the many features... go on buy this package now.
>
> *RISC USER November 1987*

> deserving of special mention is a facility called Magic Brush... a true cut and paste... '**ARTISAN**' wins hands down.
>
> *ARCHIVE February 1988*

> **ARTISAN** represents excellent value for money... superbly designed pop up menus... very friendly, foolproof and quick to use... incredibly easy to use... Instantly appealing... superb features...the Magic Pen is unique to **ARTISAN...** Quantel would have been justified in getting a little upset... well organised...
>
> *A & B December 1987 & January 1988*

ARTISAN SUPPORT DISC £19.95

Enhance the power of **ARTISAN** with this support disc containing many useful new utilities plus additional screens and fonts. Features include:

* **DISPLAY** module to create your own slide show' with 8 standard or user defined fades. The fades are used to merge one picture into another just like TV. You control the speed of the merge and you can even design your own fades with the supplied definer.
* **INTEGREX** colour dumps-one standard and one high quality
* **EPSON EX800** colour dump
* **EPSON MONO** dump
* **PATTERN EDITOR** for mono dumps
* **ADDITIONAL** fonts & screens

All the utilities work with any Mode 12 screen and so you are not limited to **ARTISAN** screens.

CEEFAX Guide

B B+ M

Software is currently transmitted for a period of one week. Files are available from Friday afternoons to the following Thursday evening, with the exception of the Issues teachers' notes which, due to their topical nature, are available from the Wednesday morning to the following Tuesday evening during the week of transmission. The details are provisional only.

September 30 to October 6

T/SWR13
Files
Trace

More in the study of sideways rom and ram programming. Errors created in other roms can be trapped and acted upon within your own sideways ram software. T/SWR13 demonstrates how the *disc full* and *cat full* errors generated by the DFS can be trapped and used to prompt for a disc change.

T/SPK00
Equdemo
Equate

This is the first in the next section of the Opcodes series which looks at the functions and uses of the Acorn speech chip. These first two programs are intended for use and modification throughout the series and allow virtually any word to be created and spoken.

!Boot
Dscedit
Dscimag
DscopeM
Scopel1
Scopel2

Datascope is a suite of six programs to turn your micro into a real time, digital storage oscilloscope monitoring signals applied to the A to D port. A two part comprehensive instruction file is included giving application examples, circuit details and so on. Several example data files will be broadcast in the coming weeks.

Decode7
D/intro

These programs have been devised to unravel the mystery of Mode 7 Teletext page creation. The hidden control and graphic codes which make up a Teletext screen may be sent to a printer for examination and better understanding. A printer is essential.

Beasty

Blobs from outer space or monsters from the marsh? It doesn't matter. Your job is to destroy anything that moves in this well written and colourful arcade action game from the June edition of *The Micro User*. Ten speed levels with up to ten initial targets leads to manic adrenalin levels.

October 7 to 13

T/SWR14
Buffer

The guide to using sideways ram continues with a look at interrupts. An interrupt can be generated by any hardware in the micro system and when this happens, and the Mos does not recognise its type, it is offered to the paged roms for action. If they also fail to recognise it, it is sent to the user via the IRQ2 vector. T/SWR14 explains how to deal with interrupts and offers a 15.75k sideways ram parallel printer buffer as an example.

T/SPK01
Beware
Pence
Clock
Tone1

This second module in the Opcodes speech series examines the speech synthesiser commands. A detailed study is made of the Texas instruments TMS 5220 speech synthesiser. The four programs with the main module provide important backing to this instruction.

Scopedata

Example data files to accompany last week's Datascope software.

Gencalc

The answers to many problems are concealed within our genes: Look no further for an explanation. This genetic problem solver is easy to use and gives clear, concise answers to monohybrid crossing. Could this be the start of biological computing?

Scroller

First seen in the June edition of *The Micro User*, this handy utility may be used in your own programs. Scroller will let you enter text then scroll it across the screen smoothly. Provisions for pausing, flashing, double height, and so on are fully provided.

October 14 to 20

T/SWR15
Sounds

The sideways ram programming series takes a look at multiple command interpreters – the method of allowing a sideways ram program to respond to any of a series of different star commands. The multiple command interpreter should accept commands shortened with a dot and/or prefixed with an optional character. T/SWR15 explains the principles involved.

T/SPK02
Reverse

The third module in this Opcodes speech series looks carefully at the Texas Instruments TMS6100 phrom chip. In particular the arrangement of data within it and various ways of manipulating this to achieve the desired results.

ScopeD

More data files to accompany the previously broadcast Datascope software.

Index
T/Index

All fingers and thumbs can lead to frustration when trying to work your way through directories to view or run programs. Let this software ease your stress by taking care of the mundane typing and eye stress needed on densely packed discs. Index is an easy to use utility of particular value to Econet users.

Plobak

Three dimensions are generally better than two. However, trying to get your mind around 3D plotting routines can be a nightmare. This program gives some insight into how this may be achieved. With careful programming the data in this program may be used for any other shape. Plobak was first published in the June edition of *The Micro User*.

October 21 to 27

T/SWR16
Help
Trace

More from the series explaining how to use sideways ram. When a multiple command interpreter is used in a SWR facility, it is easy to forget the exact syntax of all the new commands. It is often useful for a SWR program to respond to the *HELP command by explaining the format of its new commands. The multiple command interpreter is introduced in this module.

T/SPK03
Branch

Another module in the Opcodes course explaining how to get the most out of your Acorn speech system. T/SPK03 looks at the use of the READ and BRANCH instructions, vital when attempting to utilise the speech facility from machine code.

D/Info

Another seven data files to accompany the Datascope system.

T/Insce
B/Insce

Keep track of your property with this dedicated database. With particular reference to your house insurance, this program allows records of your posessions and associated details to be stored, thus enabling easier evaluation of your belongings, helping when the insurance renewal demands arrive.

Chess1
Chess2

Telesoftware goes oriental with this game from the far east – Chinese chess. Play against your friends or even the computer in this interesting graphical game from the May edition of *The Micro User*.

Rubik, your time is up

Christopher Stop shows an easy way to beat the clock

PROFESSOR Rubik's puzzles – the Cube and Magic – have kept thousands of people enthralled for hours. Now another mind-bending device – Rubik's Clock – has been unleashed on sanity. Many people have declared it impossible, and reports even stated that the professor himself couldn't solve it.

Now, with the help of *The Micro User*, you can crack the puzzle with this easy-to-use listing by following the on-screen instructions. For the more mathematically inclined, we give the algorithm for you to follow.

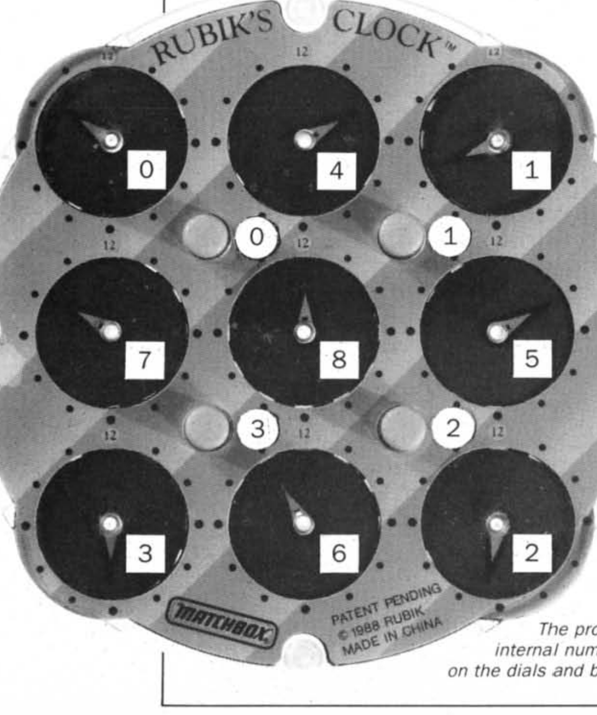
Rubik's Clock consists of nine dials on the two faces giving a total of 18 clocks. The object is to turn the thumb wheels at the corners to make all the dials point to 12. It sounds simple but another four buttons alter the mechanical linkage between the 18 dials. To further complicate matters, while you're working on one side the dials on the other move in a different way.

But the puzzle is obviously soluble because it is in the solved position when new. As there are no slipping mechanisms in the gearing, the reverse of all the moves up to that point will restore the dials. But, as we'll see, it can be solved far more easily than that.

So if you've been tearing your hair out with frustration trying to solve the puzzle simply type in the listing, correct any of your typing mistakes using Get it Right! and, when you run it, your micro will take you step by step to the solution. You should note that the program only just fits in a BBC B with disc drive, so leave out the spaces after the line numbers and don't add any extra code.

You don't need to understand how the program or puzzle works to solve it, but perhaps you want to learn more about the puzzle and discover the program's underlying algorithm. Let's start by looking at the exact effect of the thumb-wheels and buttons on the dials on both sides of the clock. In the form that programmers will understand, if you consider the button closest to the thumb-wheel you are about to turn, the mechanical linkage can be summarised as follows:

```
IF the button is down
  THEN all dials at the corner
       next to any down button
       will turn, and everything
       else on the same side
       will remain as it is.
  ELSE all dials in a square of
       four around an up button
       will turn, everything
       else on the same side
       will remain as it is.
```



The programs internal numbering on the dials and buttons

Although the rule always works for both sides of the puzzle, don't forget that buttons which are up on one side will be down on the other side, and vice versa. So, a move will affect the two sides in different ways. Another result of this rule is that the corner dials always move together on both sides of the puzzle, whereas for the inner dials, the clock faces on each side can move individually. This has a bearing on the overall solution, as we'll see later.

Having established this rule, we now know how the puzzle will react to any combination of buttons and wheel turns. So how is it solved? The first point is not to try and solve it as a whole – it is too complicated. Instead, it must be broken down into several easier stages. It's similar to doing a jigsaw – you don't just jump in and look at random for any pieces which will fit together, you find the corners, then build the edges and finally complete the middle. The latter stages are made easier by what has already been accomplished.

Incidentally, the same also applies to computer programming. If you have a big, difficult problem, break it down into simpler pieces and PROCedure-ise it. True, you'll have more problems to solve, but at least you'll be able to handle them.

So how can Rubik's Clock be broken into easier stages? Try the sequence of moves shown in Figure I to rotate a corner. You should find that the top right corner dial has advanced one position and nothing else has been affected. As the puzzle is symmetrical, applying the equivalent moves but 90° around affects only the next corner, and so on. So, we can move any corner to any position without spoiling anything else. This means we can break the problem down and solve the whole puzzle in the two stages shown in the algorithm given in Figure II.

But solving the five inside dials on each side is still difficult, so this must be further divided into simpler sub-problems. The algorithm up to now tends to solve the puzzle from the centre outwards and can be extended as shown in Figure III.

Remember, that at each stage, everything achieved up to that point must be preserved. Also, notice that the algorithm reflects the earlier observation that the corner dials are *solid* and so need to be solved from one side only.

So what we need to discover now is how to rotate the centre dial on one side only – for the first two stages – and how to rotate the four dials adjacent to the centre while (possibly) corrupting only the corners – for the next two stages.

Rotation of the centre dial on one side only can be achieved by the simple sequence shown in Figure IV and control of the dials adjacent to the central dial can be achieved by the sequence in Figure V. This final sequence was the part of the solution which took me the longest to work out, but once you see it it's obvious.

The moves shown advance the middle right dial on a upper side by one position while corrupting only the top right corner. Because the puzzle is symmetrical, the equivalent moves can be performed but with the whole puzzle turned over or rotated through 90°, thus giving control over a different clock face.

Hence, the whole puzzle can be solved using the five stage algorithm shown in Figure III while operating with the three basic sets of moves in Figures I, IV and V.

This solution sequence is coded into the program, with the extension that to operate on all the dials, you don't have to rotate the whole puzzle through 90° as suggested. Instead, the program automatically works out the equivalent buttons and dials, while you keep the puzzle upright.

To support this, the program internally numbers the buttons and dials as shown on the page opposite. This is preferable to a simple, linear numbering system, because it allows the buttons for the same sequence applied to different dials to be calculated by simple modulo 4 arithmetic.

For example, take any dial directly adjacent to the middle dial and call it n – that is n=4,5,6 or

Turn to Page 65 ►

- Rotate the whole clock until the required corner is top right
- Ensure all buttons are up
- Turn the top left wheel forward one position
- Push the top right button down
- Move the top left wheel backwards one position

Figure I: Rotating a corner

- Solve the five inside dials on each side without worrying about the corners
- Solve the corners by the sequence described in the text

Figure II: Solution algorithm 1

- Solve the central dial on the top
- Solve the central dial on the back
- Solve the four dials adjacent to the centre on the top
- Solve the four dials adjacent to the centre on the back
- Solve the corners

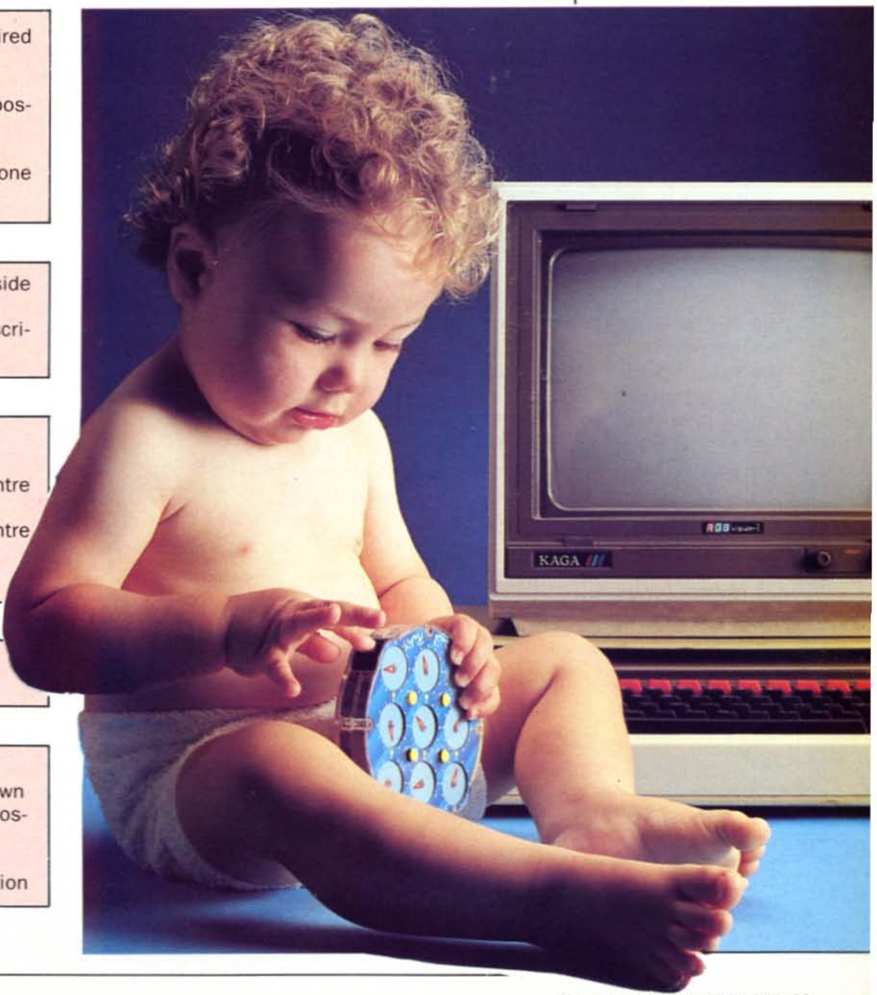
Figure III: Solution algorithm 2

- Ensure all the buttons are up
- Turn any corner dial

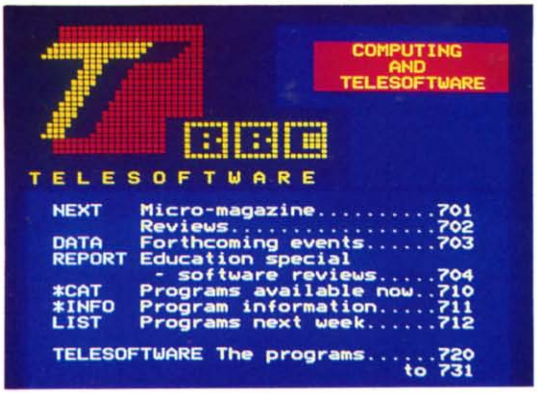
Figure IV: Rotation of the centre dial

- Ensure the top two buttons are up
- Ensure the bottom two buttons are down
- Turn the top left wheel forward one position
- Push the top right button down
- Turn the top left wheel back one position

Figure V: Control of the dial on the right of the centre one



Obtain FREE software at any time with this teletext receiver



```
                         COMPUTING
                            AND
                        TELESOFTWARE

              BBC
TELESOFTWARE

 NEXT   Micro-magazine..........701
        Reviews.................702
 DATA   Forthcoming events......703
 REPORT Education special
          - software reviews....704
 *CAT   Programs available now..710
 *INFO  Program information.....711
 LIST   Programs next week......712

 TELESOFTWARE The programs......720
                             to 731
```

With the Morley Teletext Adapter you can download software whenever you like at no charge whatsoever. Programs are updated every week and range from educational and utility software to exciting games.

You'll also be joining the 3.5 million households who regularly access the thousands of pages on Ceefax, Oracle and 4-Tel to check programme details, football results, share prices, up-to-the-minute news bulletins and much more.

The Morley Teletext Adapter is the most popular unit on the market with more than 10,000 satisfied customers – including the Department of Transport who use it to display weather maps at service stations throughout the country. It plugs straight into the user port, includes menu-driven software and automatically tunes itself to the required channel.

You'll be able to store pages in memory, use the real-time clock in your programs and automatically load associated pages each time you select a page from the menu – considerably speeding up access time.

- *The Morley Teletext Adapter is an ideal companion for your BBC Micro system.*

MORLEY ELECTRONICS
TELETEXT ADAPTER SUPPORT ROM
User Guide
MORLEY ELECTRONICS
Advanced Teletext System
USER GUIDE
MORLEY ELECTRONICS
TELETEXT ADAPTER

SAVE £27!

Look what you get!

- **Stylish beige teletext unit**
- **Official BBC Advanced Teletext rom**
- **16k utility rom (plus printer dumps)**
- **Utilities disc packed with programs to help you make the most of your receiver**

NORMAL PRICE
£127

SPECIAL OFFER PRICE
£99.95
including VAT and p&p

FREE!

When you order a Morley Teletext Adapter you will also receive a FREE gift of Morley's Design 7 Plus Mode 7 editor, worth nearly £10.

Note: If you use your BBC Micro's auxilliary power socket for your disc drive, or any other external device, you will need a power supply which we can provide for an additional £9.95.

IMPORTANT: The BBC points out that a teletext adapter, like a TV set, will not work satisfactorily without a good outside aerial. Nor will it function correctly if you experience reception problems such as ghosting. They emphasise that these problems only affect a few areas of the country. However if you have any doubts as to the quality of signal available in your area you should contact the BBC Technical Support Service during office hours on 01-927 5040.

TO ORDER PLEASE USE THE FORM ON PAGE 135

◀ *From Page 63*

7. Then the two buttons on either side of that dial are always n MOD 4 and (n+1) MOD 4. If the dials were linearly numbered, the rule would be much more complicated. Knowing this and the solution sequence, the program listing should be quite easy to follow. However, to help anyone wanting to tinker with it, a list of the main procedures is shown.

So with this puzzle wrapped up, I suppose we can now look forward to the next Rubik problem. In the meanwhile, you can amaze your friends with your ability to solve Rubik's Clock.

MAIN PROCEDURES

init	Initialises arrays defining the position and names of the dials and buttons. Also defines characters for a clock hand and envelopes.
drawscreen	Draws the graphics screen and defines a text window in the leftmost eight columns.
start	Tells you how to hold the puzzle at the start.
solve–central	Asks you if the central dial is already solved. If not, PROCsolve–central–2 is invoked to actually solve it.
solve–central–2	Takes you through the sequence of moves to solve the central dial.
all–up	Causes all buttons to be labelled as having to be in the up position.
solve–middle(D%)	Asks you if the D%th dial – which must be one of the dials directly adjacent to the central one – is already solved. If not, PROCsolve–middle–2 is invoked to actually solve the specified dial.
solve–middle–2(D%)	Takes the user through the sequence of steps to solve the D%th dial, where *D%* must specifiy one of the dials directly adjacent to the middle-one.
set–middle–buttons(B%)	Labels the setting of the three buttons which remain unaltered during the sequence to solve a dial adjacent to the middle one. The other button – which is altered during the sequence – is handled separately in PROCsolve–middle–2.
solve–edge(D%)	Asks the user if the D%th dial – which must be one of the edge ones – is already solved. If not, PROCsolve–edge–2 is invoked to actually solve the specified dial.
solve–edge–2(D%)	Takes the user through the sequence of moves to solve the D%th dial, where *D%* specifies an edge dial.
set–edge–buttons(B%)	Labels the setting of the three buttons which remain unaltered during the sequence to solve a corner. The other button – which is altered during the sequence – is handled separately in PROCsolve–edge–2.
done	Invoked when the puzzle has been completed.
turn–over	Instructs the user to turn the puzzle over.
ok(D%)	Prints "OK ?" on the specified dial using inverse printing at the graphics cursor.
solving(D%)	Prints "SOLVING" on the specified dial.
solved(D%)	Prints "SOLVED" on the specified dial. It also shows the clock hand pointing upwards.
turn(D%)	Prints "TURN" on the specified dial.
set–but(B%,up%)	Prints " UP " or "DOWN" – depending on the parameter *up%* – on the specified button. All the other PROCedures to show button positions – such as PROCall–up – work by calling this PROCedure. The text is displayed using inverse printing at the graphics cursor.
vert(T$)	Prints the text string *T$* vertically.
circ(X%,Y%,R%)	Draws a circle of radius *R%* centered on *X%,Y%*.
wait	Waits for you to press a key.
FNask–dial(D%)	Ascertains whether the specified dial is already solved and returns the result TRUE or FALSE depending on the response.
delay	Creates a small delay, and is used by FNask–dial to time the flashing of "OK ?" on the appropriate dial.

```
   10 REM Rubik's Clock Solver
   20 REM by Christopher Stops
   30 REM (c) The Micro User
   40 MODE 1
   50 PROCinit
   60 PROCdrawscreen
   70 PROCstart
   80 PROCwait
   90 PROCsolve_central
  100 PROCturn_over
  110 PROCwait
  120 PROCsolved(8)
  130 PROCsolve_central
  140 FOR M%=4 TO 7
  150 PROCsolve_middle(M%)
  160 NEXT
  170 PROCturn_over
  180 PROCwait
  190 FOR M%=4 TO 7
  200 PROCsolved(M%)
  210 NEXT
  220 FOR M%=4 TO 7
  230 PROCsolve_middle(M%)
  240 NEXT
  250 FOR E%=0 TO 3
  260 PROCsolve_edge(E%)
  270 NEXT
  280 PROCdone
  290 END
  300 DEF PROCinit
  310 DIM dx%(8),dy%(8),d$(8),bx%(3),by%
(3)
  320 bd%=170
  330 ld%=427
  340 dg%=341
  350 dx%(0)=ld%
  360 dy%(0)=bd%+2*dg%
  370 dx%(1)=ld%+2*dg%
  380 dy%(1)=bd%+2*dg%
  390 dx%(2)=ld%+2*dg%
  400 dy%(2)=bd%
  410 dx%(3)=ld%
  420 dy%(3)=bd%
  430 dx%(4)=ld%+dg%
  440 dy%(4)=bd%+2*dg%
  450 dx%(5)=ld%+2*dg%
  460 dy%(5)=bd%+dg%
  470 dx%(6)=ld%+dg%
  480 dy%(6)=bd%
  490 dx%(7)=ld%
  500 dy%(7)=bd%+dg%
  510 dx%(8)=ld%+dg%
  520 dy%(8)=bd%+dg%
  530 bx%(0)=ld%+dg%/2
  540 by%(0)=bd%+3/2*dg%
  550 bx%(1)=ld%+3/2*dg%
  560 by%(1)=bd%+3/2*dg%
  570 bx%(2)=ld%+3/2*dg%
  580 by%(2)=bd%+dg%/2
  590 bx%(3)=ld%+dg%/2
  600 by%(3)=bd%+dg%/2
  610 FOR R%=0 TO 8
  620 READ d$(R%)
  630 NEXT
  640 VDU 23,224,24,24,60,60,126,126,24,
24
  650 VDU 23,225,24,24,24,24,24,24,24,24
  660 VDU 19,1,4;0;
```

Turn to Page 124 ▶

Handling the inputs

Mike Cook experiments with his Experimenter's Board

LAST month we looked at how to handle output commands to the Body Build Experimenter's Board; now we will tackle the input side. The techniques discussed, although aimed specifically at the Experimenter's Board, apply equally to all types of input to your BBC Micro. The board's inputs are handled by the B side of the micro's VIA – normally described as the user port.

Four bits of this – those labelled 0 to 3 – are buffered through voltage comparators and the rest – 4 to 7 – are directly accessible and could be used as outputs if required. The advantage of using a voltage comparator on an input is that signals with a slow rise time can be handled.

However, before you can use the comparators you have to feed in a reference voltage for them to work with. If the input is above this it will be treated as a logic 1, otherwise it's logic 0. So the first thing to do on the board is to connect the 2.4 volt reference voltage to the comparators. This is done by connecting a wire between the Rf out and the Rf in terminals.

The memory address corresponding to the B side of the VIA is &FE60 and before we look at it we have to configure the bits to be inputs. This is done by another memory location in the VIA, the data direction register – DDR. As the name implies, this controls the direction of the data flow. Note this is relative to the micro: If it's out of the micro it's an output, otherwise it's an input.

Each bit in the DDR controls the corresponding bit on the user port – for example, bit seven in the DDR controls whether bit seven of the user port is to be an input or an output – and if the DDR contains a logic 1 we have an output and a logic 0 indicates an input. This is easily remembered as a 1 looks very much like an I for input and a 0 looks very much like an O for output. Then remember that life is never easy and so it is the other way round!

To configure the port with all the bits as inputs we have to store a bit pattern of all zeroes into the DDR. Put simply, we store the value zero into address &FE62. Having done that all we need to do is to look at memory location &FE60 to see the states of the inputs. We can isolate any single bit we want by using the AND operation: The resultant bit pattern will only contain a logic 1 when both numbers have a logic 1 in the same position.

In this way we can remove, or mask out, unwanted bits and leave only the one we want. Then if the resulting number is zero Basic will treat it as FALSE and any other number will be treated as TRUE. We take one number from the input port and AND it with another containing just a single logic 1 in the place we want to look at. The result can be used as a Boolean value that indicates TRUE or FALSE which can be used to direct the flow of our program.

Let's illustrate this by writing a simple port monitoring program. As usual it's in both Basic and Forth, shown in Listing I and II respectively:

BASIC: Line 50 initialises the port to be all inputs and line 70 reads the value into a variable *A%*. We then have to examine each bit of this number and print a zero or one depending on its value. This is done by a loop going from zero to seven indicating the bit number. A number – *P%* – corresponding to just a single logic 1 in the position of the bit number is calculated in line 110, this raises two to the power of the bit number. Then the mask and port value are ANDed in the IF statement and depending on the result, a one or zero is printed. This is repeated for all eight bits.

Finally the number corresponding to the inputs is printed in hexadecimal and then decimal.

```
   10MODE 1
   20PRINT TAB(0,3);"USER PORT INPUT
 MONITOR"
   30PRINT"Beeb Bodybuilding Course"
   40PRINT"Nov 88 By Mike Cook"
   50?&FE62=0
   60REPEAT
   70A%=?&FE60
   80PRINT TAB(0,11);
   90FOR B%=0 TO 7
  100PRINT"Input on Bit ";B%;" is ";
  110P%=2^B%
  120IF P% AND A% THEN PRINT" 1 " EL
SE PRINT" 0 "
  130NEXT
  140PRINT:PRINT:PRINT
  150PRINT"HEX"SPC(5)"VALUE IS ";~A%
;SPC(2)
  160PRINT"DECIMAL VALUE IS ";A%;SPC
(3)
  170UNTIL FALSE
```

Listing I: Port monitor from Basic

```
SCR # 3      3 H
  0 ( INPUT MONITORING WORDS )
 ;
  2 : CONFIG.IN FF FE61 C! ; DECIMAL
  3 : S.PRINT ." is " IF ." 1"
  4      ELSE ." 0" THEN CR ;
  5 : B.PRINT DUP ." Hex value is "
H. CR
  6  ." Decimal Value is " . ;
  7 : TITLE 7 MODE ." Beeb Body Buil
ding Course " CR
  8 ." User Port Monitor " CR ." By
Mike Cook " ;
  9 : P.HEAD ." Input on Bit " . ;
 10 : P.TAB 31 EMIT EMIT EMIT ;
 11 : ?BIT BIT.POS AND ;
 12 : MONITOR CONFIG.IN TITLE BEGIN
 13 -99 ?KEY NOT WHILE 6 0 P.TAB
 14 B.IN.READ 8 0 DO DUP I P.HEAD
 15 I ?BIT S.PRINT LOOP CR B.PRINT R
EPEAT ;
```

Listing II: Port monitor from Forth

```
   10MODE 7
   20?&FE62=0
   30PRINT TAB(12,3),"STEADY HANDS"
   40PRINT CHR$(134);"BEEB BODY BUIL
 DING COURSE Nov 88"
   50PRINT TAB(1,11),"Move the loop
 back to the start"
   60REPEAT
   70REPEAT
   80L%=?&FE60
   90UNTIL (L% AND 1)=0
  100PRINT TAB(0,11),CHR$(130);"GO -
----------";SPC(18)
  110PRINTSPC(37)
  120REPEAT
  130L%=?&FE60
  140IF (L% AND 4)=0 THEN VDU 7
  150UNTIL (L% AND 2)=0
  160PRINT TAB(0,11),"FINISHED !!!!!"
  170PRINT"Move the loop back to the
 start again"
  180UNTIL FALSE
```

Listing III: Basic steady hands

The Body Build Experimenter's Board was first described in the August 1988 Micro User *and enables you to learn about interfacing in a relatively painless way. It contains many components which can be interlinked to enable a wide variety of experiments to be performed.*

FORTH: The program in Forth, unlike the Basic one, is not stand alone: It relies on a word that we defined last month BIT.POS. This is one reason for the power of the language, you never have to repeat yourself, I said you never have to...

The word MONITOR defines the whole program so lets look at that. First we configure the port, you can see the CONFIG.IN definition stores &FF in the DDR. Note we do not need the & to specify hexadecimal numbers as the definition is preceded by the word HEX.

The title is then printed and, although string handling is not one of Forth's strong points, it is simple enough. However as we have not got the equivalent of Basic's TAB command to print anywhere on the screen, one is defined in line 10. Note that in true tradition the position to be TABed to is passed on the stack, making things very flexible, so we can use this word later on.

Now in line 13 we look to see if the spacebar is being pressed: If not, we do all the statements between the WHILE and the REPEAT, then look at the spacebar again. Line 14 reads in the value at the port and sets up a loop to be executed eight times. The number we are looking at is on the stack and as any stack operation will use it up we need to duplicate it first.

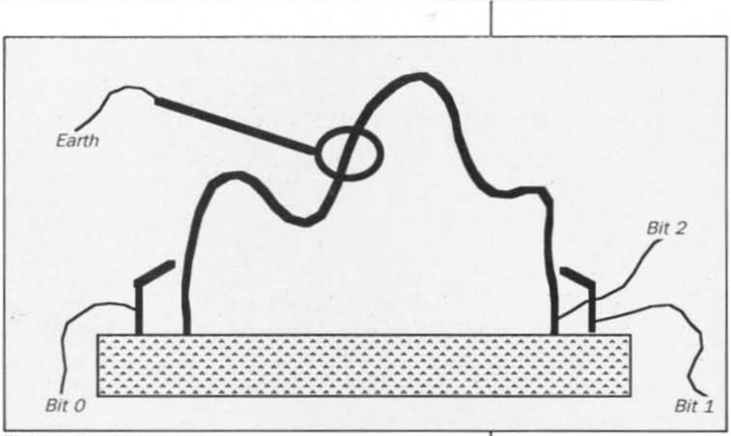
The word I places the loop counter on the stack for P.HEAD to print. Then on line 15 we again put the loop counter on the stack and send it to ?BIT which will work out the bit position and AND it with our value. Finally S.PRINT will print a zero or one depending if it is passed a true or false flag. After the loop is completed B.PRINT prints the value in hexadecimal and decimal.

One thing to note as you compare the Basic and Forth programs is that no named variables are used in the Forth version. That is not to say that Forth can't handle variables – it can – but most of the time they are simply not necessary. All the values the program needs to work with are on the stack, so when they aren't being used they don't occupy any storage space.

If you run these programs you will see that each bit appears to have a logic 1 on it. This normally happens if no input signal is connected to a logic input – we say it floats high – and in order to see some change we need to feed in logic 0 signals. This is done by attaching a wire to an earth terminal – marked E – and touching it to one of the B side inputs on the same screw connector as CB1 and CB2.

As you touch the input with the earthing wire you will see the hexadecimal and decimal numbers change and also the display of the single bit you are touching. The bit will only change when the display is updated. Note this is much faster in Forth than Basic due to the extra speed of the language. In Forth the display feels much more responsive.

Now with these simple inputs we have all the makings of the game of steady hands – very popular when I showed it at a recent Electron and BBC Micro User show in the Horticultural Halls in London. All you need to do is to take a wire coat hanger. Unravel it and fix each end in a block of wood. Now attach a wire between it and input 2 on the board. At each end wrap insulation tape and position a short length of thick wire. Attach each end wire to input bits 0 and 1.



The steady hands game

Finally make a loop of thick wire and attach it with some flexible wire to the earth connector. You can get an idea of the setup from the illustration above. You can test it is working by running the port monitoring program, touch each of the three wires with the earth loop and you should see the appropriate bits go to a logic 0.

A better way to drive the game is shown in Listings III and IV again in Basic and Forth. Each program instructs you to put the loop at the start position. Then when it reaches it you are instructed to GO: Any slight touching of the sides will result in the computer beeping. Note the beeps are stored up in the sound buffer, so if you spend a long time touching the main wire you will get an even longer series of beeps. When the end is reached you can re-trace the loop without fear of being beeped:

BASIC: Lines 70 to 90 hold the program until the earthing loop touches the start connector – bit 0 – then GO is printed in green and the starting message erased. Lines 120 to 150 monitor the inputs giving a beep if bit 2 is a zero and ending the loop if bit 1 is a zero. You are then prompted to go back to the beginning.

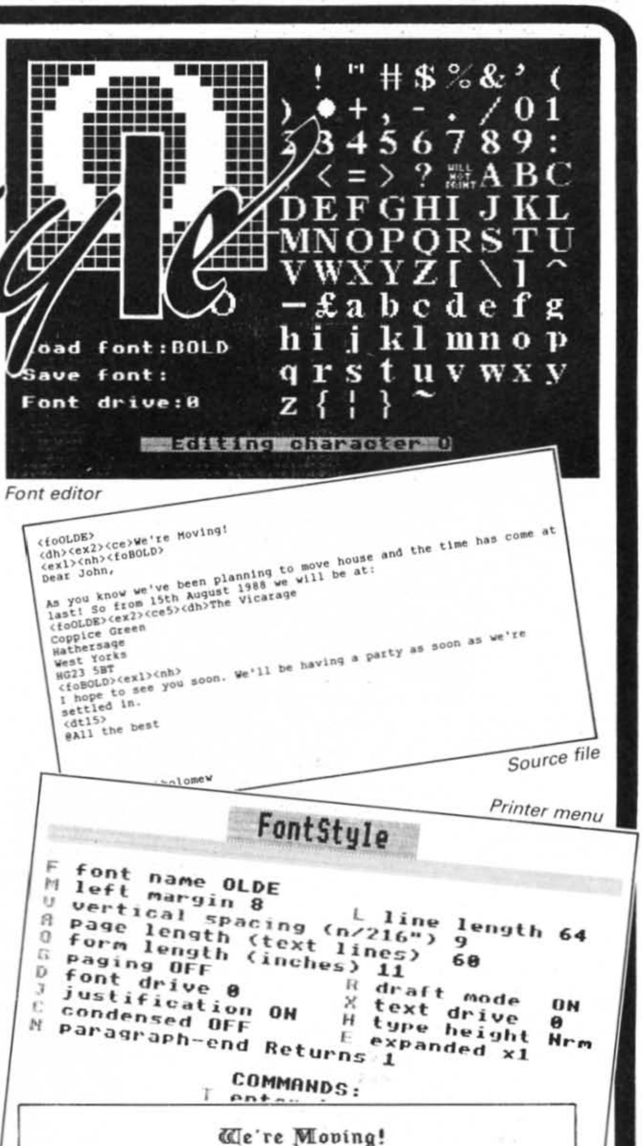
Turn to Page 69 ▶

```
SCR # 4      4 H
  0 ( STEADY HANDS GAME )
  1 : BLEEP 7 EMIT ;
  2 : TO.START BEGIN B.IN.READ 0 ?BI
T NOT UNTIL ;
  3 : ?END B.IN.READ 1 ?BIT NOT ;
  4 : ?BLEEP B.IN.READ 2 ?BIT NOT IF
 BLEEP THEN ;
  5 : S.TITLE 7 MODE ." Steady Hands
 " CR ." By Mike Cook " ;
  6 : P.START 4 0 P.TAB ." Move loop
 to the start " ;
  7 : STEADY CONFIG.IN S.TITLE
  8 P.START TO.START BEGIN ." GO ---
----- "
  9 BEGIN ?BLEEP ?END UNTIL
 10 CR ." FINISHED !!! " CR
 11 CR ." Move back to start " TO.ST
ART
 12 S.TITLE CR CR AGAIN ;
 13
 14
 15
```

Listing IV: Forth steady hands

Print in style on your micro with

FontStyle



```
                         !  " # $ % & ' (
                         ) * + , - . / 0 1
                         2 3 4 5 6 7 8 9 :
                         ; < = > ? @ A B C
                         D E F G H I J K L
                         M N O P Q R S T U
                         V W X Y Z [ \ ] ^
                         - £ a b c d e f g
oad font:BOLD            h i j k l m n o p
Save font:               q r s t u v w x y
Font drive:0             z { ¦ } ~
          Editing character 0
```

Font editor

```
<foOLDE>
<dh><ex2><ce>We're Moving!
<ex1><nh><foBOLD>
Dear John,

As you know we've been planning to move house and the time has come at
last! So from 15th August 1988 we will be at:
<foOLDE><ex2><ce5><dh>The Vicarage
Coppice Green
Hathersage
West Yorks
HG23 5BT
<foBOLD><ex1><nh>
I hope to see you soon. We'll be having a party as soon as we're
settled in.
<dt15>
@All the best
```

Source file

```
                 FontStyle

F font name OLDE
M left margin 8
U vertical spacing (n/216")  9    L line length 64
A page length (text lines)  60
O form length (inches) 11
G paging OFF
D font drive 0                    R draft mode   ON
J justification ON                X text drive   0
C condensed OFF                   H type height  Nrm
N paragraph-end Returns 1         E expanded x1

              COMMANDS:
```

Printer menu

We're Moving!

Dear John,

As you know we've been planning to move house and the time has come at last! So from 15th August 1988 we will be at:

The Vicarage
Coppice Green
Hathersage
West Yorks
HG23 5BT

I hope to see you soon. We'll be having a party as soon as we're settled in.

All the best

Graham Bartholomew

Example output

Now everyone can use the BBC Micro or Electron to design superb fonts and print them on an Epson-compatible printer. It's easy to use, and the results look so professional.

How? Just type in your text using your favourite word processor – Mini Office II, View, Wordwise and Wordwise Plus are all fully supported – put in the easy to remember formatting codes and save it. Then load up the FontStyle Print program and in minutes you have a professional, high quality output.

YOU CAN:

- Print in fast draft mode to check the display
- Use up to eight different fonts in any paragraph – (disc only)
- Print double height, double or quadruple width or condensed
- Use temporary or hanging indents

Two fonts are provided: **Bold** for classic output and **Olde** for the medieval touch. But, using the FontStyle Designer, you can produce *any* typeface you want. Not only can you design letters and numbers this versatile program lets you:

- Produce specialised characters, for circuit design or foreign languages
- Make border designs to brighten up your pages
- Design a special logo for your company
- Even print music

Say goodbye to boring dot-matrix printer fonts! With this package, the clearly written manual and your imagination you can produce perfect results every time.

£8.95	£9.95	£10.95
Cassette	5.25in disc	3.5in disc

TO ORDER PLEASE USE THE FORM ON PAGE 135

◀ *From Page 67*

FORTH: Steady is the name of the game, so let's look at that. After configuring the inputs and printing the title TO.START holds until we are at the start then the message GO is printed. Line 9 defines the simple loop that first sees if we need to beep using ?BLEEP and then sees if we are at the end with ?END. When we are at the end we print the appropriate message and go back to the start again.

Note that in ?END and ?BLEEP we need to do something when the appropriate bit is a zero, which is a logical false therefore we need the NOT word to inverse the logical value of the top of the stack.

You might like to rewrite the steady hands program to time the length of the run and even keep the name of the highest score. Look at the two examples and note how, in contrast to the Basic program, the Forth one reads as a list of instructions we have to perform. The details of how those instructions are carried out are hidden from initial view in the other word definitions. In this way it is often much easier to see what is going on in Forth than in Basic.

This is especially true if you use long and meaningful word names and in Forth there's no restriction on what the names can be. It's possible to redefine anything at all to suit your own needs. If you redefine a word you will get a warning when you compile it. All references to the word made after redefinition go to the new word, while all those made before go to the old word. In this way redefining a system word does not cause any problems.

● *Well that's inputs: Next month we'll look at the timers and shift register contained in the VIA and see how we can generate some noise, musical and otherwise.*

BEEB BODY BUILDING PACK ORDER FORM

Body Build Packs

☐ **2** *20-way cable with IDC connectors*	*£8.99*
☐ **49** *26-way cable with IDC connectors*	*£12.99*
☐ **50a** *Experimenter's Board – PCB*	*£16.48*
☐ **50b** *Experimenter's Board – Components*	*£35.00*
☐ *Special offer all the above packs at £13.46 off*	*£60.00*
☐ *Experimenter's Board – assembled with cables*	*£70.00*

Name.................................

Address.............................

....

....

Post code...........................

All prices include VAT and P&P

Educational establishment orders accepted.

Make cheques payable to Musbury Consultants and send to:
8 Fairhill, Helmshore,
Rossendale, Lancs, BB4 4JX

Foreign orders add £3.00 if airmail delivery is required.

THE MICRO USER MAIL ORDER OFFERS THE MICRO USER MAIL ORDER OFFERS

Perfect companions for your BBC Micro

Dust covers **£3.95**
Protect your micro with these top-quality covers for the BBC, Master and Compact. They are made of clear, water resistant vinyl, are bound with strong cotton and feature the distinctive *Micro User* logo.

Binders **£4.95**
These handsome, blue pvc binders are embossed with the *Micro User* logo and come with 12 sturdy metal rods to keep your issues in place, and in perfect condition.

Disc boxes **£4.95**
These luxury padded boxes also boast the *Micro User* logo and are the ideal storage medium for your floppy discs. They can each hold up to 60 5.25in floppies.

TO ORDER, PLEASE USE THE FORM ON PAGE 135

Computaccount (UK) Ltd
11 High Street, Harborne
Birmingham B17 9NT
Tel: 021 427 9898

We are major suppliers to the educational and health sectors

Please telephone for our free extensive catalogue and price list. Hundreds of products listed at excellent prices.

Archimedes

THE NEW RISC COMPUTER FROM ACORN. A VERY FAST 32 BIT MACHINE, SPECIFICALLY AIMED AT THE EDUCATION MARKET COMPATIBLE WITH MOST EXISTING BBC SOFTWARE

	Base model	+ Mono monitor	+ Colour monitor
Archimedes 305 *512k RAM, 512K ROM, 1Mbyte 3.5" drive*	£699	£749	£899
Archimedes 310 *As 305 but 1024k RAM*	£775	£825	£975
Archimedes 440 As 310 but 4048k RAM 20Mbyte hard disc & Floating point option	£2399	£2479	£2629

ACORN

NEW MASTER COMPACT series. Standard system is 128k, single 3.5 inch drive, bundled software.

Compact entry system	£345.00
Compact TV system	£355.00
Compact with mono monitor	£379.00
Compact with colour monitor	£525.00
RS 232 interface for compact	£26.00
Extra 3.5in drive for compact	£99.00
PAL TV adaptor for compact	£26.00
Master 128	£379.00
Master Econet module	£43.47
Turbo upgrade	£108.00
64K upgrade kit for B+	£34.74
Master 512K upgrade	£189.00
Level 1 file service	£86.00
Level 2 file service	£199.00
File Store E01	£799.00
File Store E02 (20mb)	£595.00
Master ROM/RAM cartridges	£11.95
Acorn DNFS kit	£84.00
1770 upgrade kit	£43.43
ADFS ROM	£26.04
CONCEPT Keyboard	£124.95
View manual	£10.00
Viewsheet manual	£10.00
Master Reference Guide	£14.95

DISC DRIVES

Opus 5802 400k DS 40/80 track	£109.00
Opus 5802DB dual 400k DS40/80 track	£205.00
Opus 5802D dual 400k DS 40/80 with PSU	£260.00
Opus DDOS kit	£59.95
Pace PSD3P 400k 40/80T with PSU	£144.00
Pace PDD3P dual 400k 40/80T with PSU	£260.00
Akhter MD802E dual 400k DS 40/80T mounted in monitor stand	£285.00
Cumana CSX100 100k SS 40T	£99.00
Cumana CS100 100k SS 40T with PSU	£129.00
Cumana CS400S 400k DS 40/80T with PSU	£152.00
Cumana CD800S dual 400k SS 40T with PSU	£295.00
Cumana CS354 SS 3.5" with PSU	£121.70
Cumana CD358 DS 3.5" with PSU	£210.00
Cuman CCD2000S 3.5" + 5.25" with PSU	£282.17

OPUS PC

PC3 SF Mono 256k	£549.00
PC3 TF Mono 768k	£795.00
PC3 HD Mono 1024k	£995.00
PC5 (AD) HD Mono 1024k	£1349.00
EGA System available – please add	£300.00

MONITORS

Mono	
Sanyo DM4112	£79.95
Sanyo DM9112	£126.00
Philips green Hi-res 7502	£85.00
Philips amber Hi-res 7522	£85.00
Zenith green Hi-res 1230	£85.00
Zenith amber Hi-res 1220	£85.00
Colour	
Microvitec std-res 1431	£191.00
Microvitec med-res 1451	£229.00
Microvitec hi-res 1441	£399.00
Philips 8833 RGB Med-res + composite video	£251.00
Monitor cables (state type required)	from £3.50
Master Monitor bridge single height	£25.00
double height	£28.00

AMSTRAD

*** New 1640 now in stock ***

Amstrad 1640
Enhanced colour display

Single 360k floppy drive	£799.00
Twin 360k floppy drives	£899.00
Single 360k floppy drive + 20Mbyte hard disc drive	£1199.00
Colour Twin floppies	£649.00
20Mb Hard Drive	£260.00
PCW 8256	£299.00
PCW 8512	£399.00
PCW 9512 with Daisywheel printer	£499.00
Amstrad 3" discs box of 10	£28.00

SOFTWARE:
Call for full list of IBM Compatible and Amstrad software

PRINTER ACCESSORIES

Epson FX 100/105 Sheet Feeder	£139.00
Brother HR sheet feeder	£209.00
Epson MX/RX/FX 80 Ribbons	£2.95
Epson MX/RX/FX 100 Ribbons	£4.50
Canon PW 1080/1156 Ribbons	£5.00
Taxan Kaga KP810 Ribbons	£5.00
Citizen printer ribbons	from £3.65
All Epson Spares available	£POA
Listing Paper (Box 2000)	from £13.10

Massive range of other compatible ribbons available

BOOKS

Wide range of computer books now in stock for:-
BBC
ARCHIMEDES
MSDos
ARM
AMSTRAD

PRINTERS

DOT MATRIX

Epson LX800 150cps 80col NLQ	£205.00
Epson LQ500 24pin + paper park	£327.00
Epson FX800	£345.00
Epson FX1000	£440.00
Epson EX800 (optional colour)	£457.88
Epson EX1000 (optional colour)	£614.63
Epson LQ 850 180cps 24 pin matrix NLQ	£479.00
Epson LQ 1050 180cps 24 pin 132 col NLQ	£659.00
Canon PW1080A NLQ 80col 160cps	£258.00
Brother 1109 Par + Ser 100cps + NLQ	£211.50
Brother 1409 Par + Ser	£349.00
Brother 1509 Par + Ser 180cps + NLQ	£449.00
Brother 2024 Par/Ser NLQ 24pin 160cps	£750.00
Star NX 15 NLQ 132 col 120cps	£330.65
Star SD10 NLQ 80col 160cps	£330.65
Star SD15 NLQ 132col 160cps	£415.65
Star NB2415 NLQ 24 pin 216cps	£645.15
Star NB15 NLQ 24pin 300cps	£806.65
Citizen 120D 120cps NLQ 80col	£169.00
Citizen LSP100 120cps Eps/IBM comp NLQ	£225.00
Citizen MSP 10E 160cps Eps/IBM comp NLQ	£269.00
Citizen MSP 15E	£299.00
Citizen HQP 40 24 pin	£495.00
Citizen HQP 45 24 pin	£595.00
Amstrad DMP 3160	£189.00
Amstrad DMP 4000	£299.00
Amstrad LQ 3500 24 pin	£299.00
Amstrad LQ 3500 24 pin	£299.00
Amstrad LQ 5000 24 pin 288cps	£399.00
Panasonic KX-P 1081	£279.00
Panasonic KX-P 1090	£233.00
Panasonic KX-P 1092	£315.00
Panasonic KX-P 1592	£405.00
Micro-P MP165 NLQ	£208.70
Micro-P MP200 "NEW"	£299.00
Parallel printer cable BBC	£9.00
Parallel printer cable IBM etc from	£15.00
DAISY WHEELS	
Brother HR20	£399.00
Brother HR25	£480.00
Brother HR40	£995.00
Juki 6000	£179.00
Juki 6100	£299.00
Juki 6200	£454.00
Juki 6300	£694.00
LASER	
Epson GQ3500	£1450.00
Citizen Overture	£1390.00
Brother HL-8 Mutli Emulation	£1895.00
Star LP-8 Lazer Printer inc maint	£1995.00

Archimedes Reference Manual	£29.95
Archimedes Podule Back Plane	£39.00
Archimedes ROM Podule	£56.00
Archimedes I/O Podule	£78.95
Archimedes Midi I/O Add-on	£39.00
Archimedes Midi Podule	£69.00
Archimedes Econet Podule	£43.00
Archimedes PC Emulator	£95.00
Archimedes .5 Mb RAM for 305	£149.00
Archimedes Floppy Drive Unit	£125.00
Archimedes 20Mb Hard Disk	£469.00

Personalised Gift Vouchers
Now available

BBC ROM SOFTWARE

InterWord	£48.00
Intersheet	£48.00
Interchart	£28.50
Interbase	£59.00
Acorn	
View 2.1	£45.00
View 3.0	£63.00
ViewPlot (Disc)	£25.75
ViewSpell	£33.50
Viewsheet	£45.00
Viewstore	£45.00
GXR (please state whether for B or B+)	£23.00
ISO Pascal	£52.00
LISP	£39.00
BCPL	£46.00
Logo	£52.00
ADFS	£26.04
Computer Concepts	
Wordwise Plus	£40.00
Printmaster	£25.00
Accelerator	£48.00
Speech ROM	£27.50
Spellmaster	£46.00
Beebugsoft	
Toolkit Plus	£33.00
Wordease	£25.00
ICON Master	£29.00
ROMIT	£29.00
Help II ROM	£27.00
Sleuth ROM	£27.00
Exmon II	£28.00
Spellcheck III	£32.00
MUROM	£24.00
Pace	
Commstar	£29.57

AMX

Please state whether for BBC or Master

AMX mouse with Super Art ROM	£78.00
Stop Press	£43.43
Paintpot	£13.00
Desk	£21.70
Super Art ROM	£43.43
Database	£21.70
Utilities	£13.00

ARCHIMEDES SOFTWARE

System Delta Plus Database	£69.95
System Gamma Plus Graphics	£69.95
System Delta Account (per module)	£64.95
School Administrator	£79.95
Video Rental	£69.95
Newsagent	£69.95
Clares AlphaBase	£49.95
Clares Image Writer	£29.95
Archimedis Tool Kit Module	£39.95

SPECIAL SOFTWARE

Torch Turbo Library £45.00
functions and procedures for Turbo Pascal to access the power of Torch/BBC facilities

dBase special £45.00
dBase helper program now available for those who want to access the powerful facilities in dBase, without having to learn how to program in dBase

---

HOW TO ORDER

Payment by cheque to:
COMPUTACCOUNT (UK) LTD

Carriage: Items less than £50: £2.50, £50-£100: £4.50
Carriage and insurance on items more than £100: £9.50

Please add VAT at 15% to Total, including Carriage

NAME ....
ADDRESS ....
.... Tel: ....

Quantity	Item	Price	
....		£	£ ....
....		£	£ ....
....		£	£ ....

Total £ ....

Send to Computaccount (UK) Ltd., 11 High Street, Harborne, Birmingham B17 9NT
or Telephone 021-427 9898 with your Access details
(No cash by post please)

MICRO USER CLASSIFIEDS

Has upgrading your BBC Micro given you hardware you no longer need? Or have changing interests left you with unwanted software? Then THIS is the place to advertise your surplus items.

Our 179,000 readers are always on the lookout for a bargain and this is the first place they'll look!

An added bonus!

Your advert will be automatically displayed on MicroLink, the electronic mail service operated in association with Telecom Gold. This means it will be seen by thousands of computer enthusiasts who can send an instant response.

- BBC model B issue 7 £145 O.N.O Tel: 0532 689847 (Leeds).
- Teletext adaptor (Acorn) A.T.S. rom, hardly used £65 O.N.O. Zenith monochrome monitor, boxed, as new, £45 O.N.O. Tel: 0905 355216 (Evenings).
- Brother M1009 printer tractor feed, Watford NLQ rom £50. Quest 40 Tr S/S drive £35. Tel: 01-855 1034.
- Compact Base System including Roms: Viewstore, View, Logo, Dumpmaster, ACP1770 DFS, software leads Vigilem rom adaptor cartridges Digimouse Chauffeur £350 O.N.O Tel: 01-986 4442.
- Swap Triumph Toledo, 1 Yr M.O.T, for BBC B, Dual 40/80 drives, Monitor Tel: Loughborough 0509 843214 Evenings.
- Acorn 65C102 second processor including adaptor case as new £125. Acorn Z80 second processor all software and manuals plus Wordstar Professional £160. Pace Nightingale modem and Commstar 1 . £120 Tel: 0525 375179.
- 32016 Cambrdige co-processor 1 Mb 10MHz Panos13 with £2000 software including GCAL, BCPL, REDUCE, GKS-UK, MATRIX3, VUWRITER, SPICE, only £700 Tel: BB on 0234 750770.
- Universal Teletext adaptor £60 BBC ATS rom manual £8 Tel: 082581 3356.
- BBC B Torch Z80 discpack, Aries B20, 2K Mem. Exp. Aries B12, Rom board, 'Perfect' software, toolkit, Discdoc Etc. Beebug mags. Accept £295 Tel: 04974 321.
- Watford co-processor adaptor with 512K rom board and DFS upgrade. Runs IBM software on your beeb Tel: Peter 04577 5354 needs twin 80Tk drves £120.
- Morley teletext adaptor with own power pack and T.U signal boaster as new £85 Tel: 021-7052 188.
- AMX Stop-Press roms, disc and manuals incl Watford Fonts. Solderless sideways rom board. Boxed, as new hardly used £25 each. £45 together. Tel: 0260 278094 (Evenings).
- Complete MicroLink Dual-Speed modem with software quite new hardly used £125. Manuals, Leads, postage included Tel: Mark 0362 693790.
- Printer Shinwa CPA80 Plus £75 O.N.O Tel: Nigel 0203 504254.
- Pen pals wanted with BBC and 80Tr disc drive to swap hints, tips Etc Tel: 0272 855323.
- Philips 8524 STD/RES colour monitor 16 months old mint condition offers. Watford DDFS £25 Tel: 0942 717454.
- Modem, Nightingale Multi-Baud and bell, boxed, £70 inc manuals, leads. Taxan amber monitor, C/W leads as new £65. Tel: 0424 576640.
- Master 512 upgraded twin 40/80T drives, Citizen printer, books, software, joysticks, new £1300 selling for £650 O.N.O Tel: James Frodsham 32993.
- Master 128 plus 512K second processor board, single 80 trk drive all mounted in Vigilen console plus manuals and some software £550 O.N.O Tel: 05097 2846.
- BBC B 1.2 DNFS 40/80 DS drive cassette unit Microvitec 1451 vine replay Vigilen cartridge system computer desk discs. Manuals books £300 Tel: Basingstoke 0256 461773.
- Bought six months ago BBC Master + double disc drive with colour monitor only £600 also ten blank discs. Tel: Birmingham 326 9383.
- 40/80Trk DS drive inbuilt PSU £70. Nidd-valley Digimouse £25, Elite, Thrust, Future Shock, advanced user-guide, £5 each 128k/64k EPROMS, Master rom cartridge £5 Tel: 0582 599681.
- BBC B, OS 1.2, DFS DS/DD 40/80 drive, 32K SWR, two joysticks Exmon II, loads of software, discs, books, magazines, offers around £350. Also 40 Trk drive £35 Tel: 09074 4832.
- Wanted for schoolgirl BBC B disc drive, colour monitor Tel: 0582 598521.
- Acorn Prestel Adaptor with Prestel Rom perfect £80. Shinwa CP80 look-alike printer (Cosmos) working £50 O.N.O. 300 Baud acoustic modem (ambit) working £20 Tel:01-644 8763.
- Five months old Watford 1.44 DFS with full fitting instructions £45 O.N.O Tel: 0727 63674.
- Watford Video Digitiser for BBC B £75 Tel: 08293 2727.
- Star NL-10 dot-matrix printer + fully automatic sheet feeder, very good condition and two ribbons, paper and parallel interface cartridge, and lead. Perfect for small business/home. All boxed. Worth over £300 only £250 O.N.O. Paul 061-653 7542 after 5pm. All manuals included.
- Cumana CS400 PSU drive £90 Opus 40/80 D/S drive £80 MAX £15 GRX £15 Tel: 0384 270985.
- Cumana DD DFS suitable for any BBC £30 O.N.O. Tel: 0424 813296.
- BBC B issue 7 including manual, excellent condition £210 Tel: Kidderminster 0562 60242.
- Microvitec high resolution colour monitor (as new) £140, Epson MX-80 F/T+ printer (as new) £120. Tel: 0272 566415.
- Cheap BBC/Electron games (Barbarian etc). S.A.E. to P.Sanderson 69, Rhodes Avenue, Newbold, Chesterfield, Derbyshire.
- Eprom Programmer. Does 8/16/32/64K. Includes Rom software £35 Tel: Simon 0829 260476 Evenings.
- Master 128 in Viglen case + manuals £325 O.N.O Tel: Dave 0203 307003 or 0926 493610 after 6pm.
- BBC B Issue 7 Viglen case, twin 40-80 drives, lots of games £475 Tel: Dave 0203 307003 or 0926 493610 after 6pm.
- Acorn Z80 second processor with all software and manuals. £150, postage negotiable. Tel: 0582 412368. Prestel 584212368. Gold 72:MAG10845.

Ads will be accepted under the following conditions

- This service is EXCLUSIVELY for the use of private readers. No trade ads will be allowed.
- To avoid encouraging software piracy, all ads will be carefully vetted before they are accepted.
- Ads can only be accepted on this form (or a photocopy of it).
- There is no maximum to the number of words you include in your ad. If there is insufficient room on the form, continue on a separate sheet of paper.
- The cost is 20p per word, with a minumum of 10 words.
- *We GUARANTEE your ad will appear in the next available issue of* The Micro User.

PLEASE PRINT THIS AD IN THE NEXT MICRO USER

Name________________

Address________________

Cheque enclosed for £______
(minimum £2 for 10 words)

I certify that any software offered for sale is original and not a copy

Signed________________

POST TO: Micro User Classifieds, FREEPOST, Macclesfield, Cheshire SK10 4YB.

POOLSWINNER II

THE ULTIMATE POOLS PREDICTION PROGRAM

Boxed with detailed instruction booklet

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **LEAGUE AND NON-LEAGUE** All English and Scottish League teams are supported, and also the non-league sides often used on pools coupons.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

PRICE £18.00 (all inclusive)

NOW AVAILABLE

FIXGEN 88/9

AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish League fixtures for 1988/89. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner. Yearly updates available.

POOLSWINNER with FIXGEN £19.50 (for both)

COURSEWINNER V3

THE PUNTERS COMPUTER PROGRAM

NOT JUST A TIPSTER PROGRAM, Coursewinner V3 can be used by experts and occasional punters alike. You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date. *FULL PRINTER SUPPORT.*

PRICE £18.00 (all inclusive) includes Flat AND National Hunt versions.

AVAILABLE FOR

All supplied on tape ...
(Automatic Conversion to disc)

AMSTRAD CPCs
BBCs
COMMODORE 64/128
SPECTRUM

DISCS ...
(Add £3.00)

AMSTRAD PCW
IBM Format
COMMODORE AMIGA
ATARI ST

Send Cheques/POs for return of post service to . . .

selec SOFTWARE

phone 24 hrs

62 ALTRINCHAM RD, GATLEY, CHEADLE, CHESHIRE SK8 4DP. ☎ 061-428 7425

(Send for full list of our software)

G2 Systems: 5 Mead Lane, Farnham, Surrey GU9 7DY.
Telephone: (0252) 712525

CHROMA 300 SERIES – genlock system for BBC Micros

The Chroma 300 is a genlock and video overlay system for the BBC Micro range, including the Archimedes. It enables the output of the computer to be superimposed, in colour, on a PAL video signal from a video recorder or camera for less than £300 (ex VAT).

G2 Systems is the U.K. specialist in interfacing computers to video equipment. We offer a wide range of hardware such as genlocks and RGB to PAL coders plus video software for captioning, painting, prompting etc. If you want professional advice about anything to do with video and the BBC Micro give us a ring on **0252 712525.**

Computer Solutions for Video

G2 SYSTEMS

COMPUTECK "The Trade-in Specialists" APPROVED ACORN DEALERS

ARCHIMEDES

	Basic	Mono	Colour
A305	763.65	829.20	1004.00
A310	912.23	977.78	1152.58
A310M	977.78	1043.33	1218.13
A410	1528.40	1583.03	1746.90
A440	2762.93	2828.48	3003.28

* * * * * * * * * * * * *

The above are NEW prices for the Archimedes – All Discounted!

Full range of Archimedes podules etc etc stocked – ring for price

* Master Series from	£412.95
* Compact Series from	£375.69
* Compact Professional:- Computer, Monitor, Brother Daisy wheel & Overview from	£709.03
Specuak Cambridge Z88	£267.37
Sec/User BBC B's from	£199.00
6502 Sec Processors	£103.50U
Master 512 Module	£149.50U

MONITORS

Philips 8833 Colour	£275.82
Philips 8852 Colour	£309.46
Philips 7502 Green	£83.65
MicroVitec 1431	£211.64
Microvitec 1451	£189.74U
Microvitec 1441	£430.10
Kaga Taxan Sup/v III	£395.98
Microvitec 1431	£149.50U
Tatung Col Monitor	£169.00

PRINTERS

Panasonic KX P1081	£169.00
Panasonic KX P1082	£243.80
Citizen 120D	£171.63
Epson LX800	£268.80
Epson LQ800	£539.05
Micro P 135+	£159.36

NIDD VALLEY PRODUCTS

Digimouse + Artroom	£53.91
Digimouse + Graphic	£35.91
Digimouse + Illustratror	£40.39

*** We Specialise in Trading in Used Hardware & Software also we buy in certain Software & Hardware**
*** Anything we have for almost Anything you have**
*** * * NEW LAMPS FOR OLD * * ***

LASER PRINTERS

Epson GQ3500 laser	£1692.68

We offer a special help line on the GQ3500 with custom software soon! ! !

VARIOUS HARDWARE

ACP Battery backed RAM	£37.17
ACP ROM Adaptor 2	£13.90
ATPL Sideways ROM Board	£41.50
Cambridge Z88 32K RAM	£18.95
Cambridge Z88 32K ROM	£18.95
Cambridge Z88 128K RAM	£47.43
Cambridge Z88 128K ROM	£47.43
Cambridge Eprom Eraser	£37.95
Cumana touch Pad	£34.50U
Graph Pad	£69.00U
Morley AA Board	£43.64
Morley RAM Disc 1 Meg	£189.92
Morley RAM Disc 2 Meg	£332.41
Morley Teletext Adaptor	£65.00U
Pace Linnet Modem inc Commstar Comms ROM	£143.86
Pace Nightingale Modem	£69.00U
Ferguson TV Tuner	£55.00
Vine Micros ROM Board 3	£17.94
Vine Micros ROM Board 4	£26.94
Voltmace delta 14B	£9.20U
Acorn Master Cartridge	£9.20U
Peartree Mast Cart PEP002	£9.20U
Prism 200 Modem	£40.25U

ADVANCED MEMORY SYSTEMS

AMX Design	£62.98
AMX Mouse+Superart+OS	£71.94
AMX Superart	£44.94
AMX Max	£12.00U
AMX Desk	£22.44
Extra Extra!	£15.00U
AMX Stop Press	£44.98
AMX Stop Press	£33.00U

DATABASE SOFTWARE

Mini Office disc 5.25	£12.70
Mini Office disc 3.5	£16.45

**** We Stock ALL the popular and unpopular games both new and used from as little as £1.72.**
*** The above are just a few of the items we have on our lists at present we have over 1000! Please tel or send a large SAE for up to the minute prices**

DISC DRIVES

No PSU Drives

Ahkter 40/80 400K Single	£118.95
Ahkter 40/80 800K Dual	£229.44
Cumana CSX400 Single	£138.54
Cumana CDX800S Dual	£256.45
Pace PSD3 Single	£137.13
Pace PDD3 Dual	£254.86
Opus Single 40T	£51.75U
Acorn Single 40T	£46.00U

With PSU Drives

Ahkter 40/80 400K Single	£131.69
Ahkter 40/80 800K Dual	£276.20
Cumana CS400 Single	£161.95
Cumana CD800S Dual	£305.94
Pace PSD3P Single	£161.71
Pace PDD3P Dual	£302.73

Hard Disc Units

Ahkter 20Meg HD2000	£539.94
Ahkter 40Meg HD4000	£809.94
Viglen 20Meg Drive 0	£584.07
Viglen 20Meg Drive 1	£494.09
Viglen 40Meg Drive 0	£940.49
Viglen 40Meg Drive 1	£737.08

ACORNSOFT

Basic Editor	£18.00U
C language	£51.75U
ISO Pascal (Archimedes)	£65.00U
Logo	£39.00U
ISO Pascal ROM	£55.20
Lisp	£9.19U
Logistix (Archimedes)	£102.46
Micros in Business	£39.95
Twin (Archimedes)	£30.00
View 3.0	£47.84
View Index	£11.96
View Plot	£23.95
View Professional	£79.94
View Sheet	£47.84
View Spell	£23.00U
View Store	£52.61

WIGHT SCIENTIFIC

Wight Signwriter	£26.94
Fonts for above each	£5.17

*** All prices in this Advert include VAT at 15% Post and Packing charges 92p for light items, £1.95 for medium items. Expensive products £7.48 Courier delivery Items marked "U" are used stock**

BEEBUG SOFT USED SELECTION

Discmaster	£13.80U
Teletext Tape	£4.02U
Master File II Disc	£11.50U
Printwise Disc	£14.95U
Quickcalc disc	£11.50U

* We stock the complete range of Beebug Soft all Discounted

CLARES MICRO SUPPLIES

Alpha Base (Archimedes)	£44.94
Artisan (Archimedes)	£35.95
Toolkit (Archimedes)	£35.95
Brom BBC	£11.50U
Macrom	£17.25U
Fontwise 5.25" package	£26.99
Fontwise 3.5" package	£30.59

COMPUTER CONCEPTS

Inter-Base	£55.20
Inter-Chart	£29.44
Inter-Sheet	£45.08
Inter Word	£45.08
Inter-Chart (Archimedes)	£23.00
Inter-Sheet (Archimedes)	£35.88
Inter-Word (Archimedes)	£35.88
Mega 3 ROM	£87.97
Spell Master	£47.19
Wordwise Plus	£30.00U
ARM Ass Lang Book	£11.65
ROM podule Arch Bat/Back	£64.44

DABS PRESS

Master Guide Book	£11.65
Viewstore/Sheet Book	£11.65
View Guide Book	£11.65
Master Emulator Rom	£17.94
Program Discs for books	£7.14
Hyper Driver	£26.49

VINE MICROS

Relay Tape to Disc	£31.48
Romboard 3	£17.94
Romboard 4	£26.94
Write Protect Switch	£8.05
TD ROM for BBC B	£13.80U

COMPUTECK Ltd. Dept (MU)
I.O.O.F. House
69 High Street West
Glossop
Derbyshire SK13 8AZ
VISA/ACCESS Tel: 04574 65953

MINERVA SYSTEMS

System Delta+Card Index	£58.45
Deltabase (Arcnimedes)	£26.94
System Delta Plus (Arch)	£62.95

Accounts Packages all 10% Disc.

PERMANENT MEMORY SYSTEMS

Genie in a Box	£71.41
Genie Junior	£22.49
Genie Master Cartridge	£71.41
Genie Utilities	£8.94
Gene Real time Clock	£26.08
6502C B2P Sec Processor	£80.95

Introducing three titles under our own label "SENSIBLE SOFTWARE" Introductory Price £14.95 each

TheMenu

Displays both sides of a disc on scrolling window: Auto LOADS BASIC, M/Code & WP files: file handling made easy: Shows all 16 ROMS: loads ROMS automatically in SWR and saves to disc: this is what a !boot file was made for.

TheList

Auto selects DFS/ADFS: Allows 39 chars. description of files so months later you know what a file was and where it is. ADFS path route shown and routing made easy: Printout of all data to keep in each disc envelope.

TheLabel

The ultimate Label printer, Bold, NLQ, Condensed, Enlarged, U/Lined etc. WYSIWYG on screen editing: Auto duplication from one to print as many as you want: Configures to many label sizes and numbers across: If you print labels this is a must!

*** We are mainly Mail Order but personal callers are welcome to collect goods and arrange for demonstration of computers and accessories. Please telephone to arrange appointment first.**

Video action

Mike Cook mixes signals and colours his pictures

Product: Chromalock (plug-in card)
Price: £339.25
Producer: Wild Vision, 6 Jesmond Rd, Newcastle upon Tyne, NE2 4PQ
Tel: 091-281 8481

THE Chromalock from Wild Vision is a plug-in card for the Archimedes that permits genlocking and PAL encoding. Having said that – and that it works – what more is there to say? Perhaps a few words of explanation for those unfamiliar with the technical terms.

The BBC B can send its signal into a colour TV set or monitor because a PAL encoded composite video signal is produced. This is relatively easy to do because of the limited colours – fully saturated primary and secondary ones. However, to perform the same PAL encoding on the possible 4096 colours of the Archimedes requires much more complicated circuitry. Therefore it was omitted from the Archimedes, and those that need it can buy the circuit separately.

So what? Why would you want a PAL encoded signal? Well, first of all it allows you to use a composite colour monitor or, with the addition of a cheap UHF modulator, lets you use a colour TV set. However at the price of the Chromalock it is cheaper to buy an analogue RGB monitor.

The advantage comes in that you can use PAL encoded output to produce titles and animated graphics for use in a television studio or your own video recordings.

Now for the genlock bit. If you take two video signals, say one from the micro and one from a camera, you can't just mix them together. It's rather like trying to jump between two speeding cars on the M1; you will only be successful if the cars are doing exactly the same speed and are alongside each other.

In effect a genlock alters the speed and timing of the Archimedes video signal so that it matches another video signal exactly. In this way you can mix the video from a live camera or pre-recorded tape with that from the Archimedes.

And there are a great many things you can do with such a system. For example, you can record titles, superimpose labels and incorporate computer graphics. Suppose you were making a video to explain how a computer works, after showing the actual hardware you could fade to an animated graphic of the data flow through the central processor.

The Wild Vision Chromalock is a single Eurocard size board with a full panel which plugs into one slot. A short lead connects the normal RGB output from the Archimedes into the podule. In addition there are two BNC connectors one for the incoming video and the other for the outgoing video.

Not only is the Archimedes locked to the incoming video, but the two signals are mixed. We had great fun at the office putting up derogatory captions and then pointing the camera at a chosen victim.

There is a key-in facility which allows a certain intensity of a colour to operate a high speed switch between the incoming video and the micro's output. This is technically known as inserting, and is useful for removing any background video, thus making the computer's output clear and uncluttered.

This switch can also be operated by using the supremacy bit from the Archimedes VIDC chip, which requires the connection of a wire soldered directly to the micro's board.

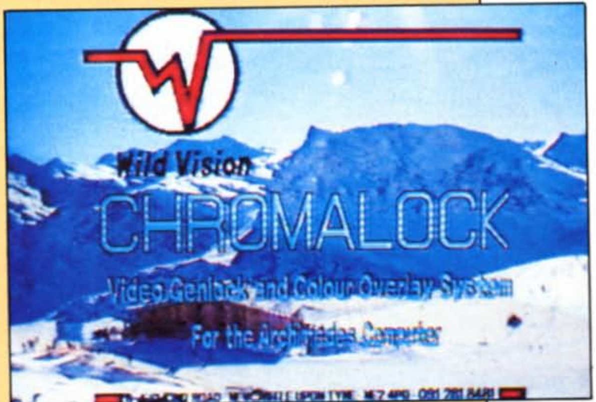
The Chromalock can be used in local or remote mode. In the latter the external video signal provides the timing and colour burst signals for the output. In the local mode these are supplied by the computer. For economy in this mode the colour burst signal is not locked to the line sync signals, which can produce the dot crawl effect familiar to anyone using a BBC B on a colour TV set. Of course, with a properly generated signal to lock on to, this is not a problem.

The system works quite well and the picture quality is high – certainly very much better than the output of the BBC B. My only slight reservation was that there was a marked deterioration in picture quality when Acorn's input/output podule was fitted in the Archimedes at the same time. This pointed to regulation problems, with the Archimedes not being able to supply enough current to power both modules, though possibly our Archimedes was at fault.

While this podule is not cheap it does perform well and its price compares very favourably with commercial units which do the same job. And for those wanting different features or only the genlocking facility, a wide range of units are available from Wild Vision.

The name of this product has now been changed to the Chroma 305 and it is part of the Chroma 300 Series Video Genlock System.

Units are available for BBC B, B+, Master and Archimedes. You can also obtain professional versions.


Wild Vision
CHROMALOCK
Video Genlock and Colour Overlay System
For the Archimedes Computer

Mixing micro and video signals

RISC USER

The Archimedes Magazine and Support Group

IS ONE YEAR OLD
GREAT BIRTHDAY OFFER
WORTH OVER £50
The volume One Special Disc
Yours for only £4.95
when you join RISC User.
SUBSCRIBE NOW
AND BENEFIT
FROM OUR
SPECIAL
BIRTHDAY
OFFER

SPECIAL DISC CONTAINS ALL THIS FOR JUST £4.95

1 Pixel Editor

This powerful drawing tool is a full-screen full-feature pixel editor, for creating and editing screens and sprites.

2 Toolbox

This incredibly useful utility features a memory editor, memory search and replace, disc editor and disassembler. TOOLBOX contains many of the features found in packages costing over £35.

3 World in Motion

A stunning animation with an oddly reminiscent feel to it.

4 Arcscan

A fast on-screen bibliography with powerful search facilities for all the RISC User and BEEBUG magazines published. Normal price £12.

5 Disc Menu Module

Use the mouse to control your disc files with this extremely useful relocatable module.

6 Printer Buffer

This printer buffer frees your computer during long printouts and is configurable from a few bytes to 4 Mbytes. Similar to packages currently selling at £19.

Altogether the items on this disc would be worth over £50 if bought separately.

This is what you've missed in volume1

	Issue
All Mode Screen Compressor	5
CMOS RAM Editor	2
Fast Directory Copier	6
Fancy Font Scroller	7
Full Screen Pixel Editor	4
Intelligent Auto-Configure	6
Logical RAM Tracer	4
Animation Techniques	8
Mandlebrot Fractals	5
Mouse Pointer Designer	4
Multi-Tone Printer Dump	2
Using The PC Emulator	8
New Sound Voices	4
Fast Image Rescaler	9
A Module For Twin	6
3D Landscape Editor	9
Screen Manager Utility	5
Image Distortion	10
Solids Manipulation	6
Scrolling Memory Editor	3
. . . and much more	

BACK ISSUES AVAILABLE TO MEMBERS

I wish to subscribe to RISC User for one year (10 issues) at £14.50* ☐

I also wish to receive the VOLUME ONE SPECIAL DISC @ £4.95* ☐ (tick)*

I enclose a cheque made payable to BEEBUG Ltd for £ ________

or I wish to pay by Access/Visa/Connect No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Name ________ Card Expiry date ☐☐

Address ________ Signed ________

Post Code ________ *UK PRICES ONLY – OVERSEAS PLEASE APPLY

Send to: RISC USER, Dolphin Place, Holywell Hill, St Albans AL1 1EX
24 hour hotline: 0727 40303 or 24 hour Fax: 0727 60263

B B+ M

BBC Micro expertise

Francis Botto shows how to create your own expert system

ARTIFICIAL INTELLIGENCE

ARTIFICIAL intelligence is possibly the fuzziest term in the computer dictionary. No one can agree about its actual meaning, which makes for interesting debate if it doesn't drive you round the bend first. Here we present an expert system – but is it artificial intelligence? Most AI gurus say such systems aren't intelligent, but there are those who believe they are – it all hinges on your definition.

Expert systems are an attempt to emulate the knowledge and – more important – the *reasoning* of a human expert. In other words they're designed to share an expert's knowledge and experience with others, like you and me.

For example, you mightn't know much about micro repair, but with the help of an appropriate expert system, you could be suitably advised. So this type of software is not only for specialists or boffins, quite the opposite in fact, as it is of most use to the less informed. As you'd expect, expert systems often serve as learning aids as well as helping to optimise your skills.

The fact that human experts of all kinds share a universal process of reasoning when solving problems makes possible the idea of an expert shell where the knowledge base can be created according to a particular need.

Within an expert system, the computations that use the knowledge base in a meaningful way are the same for any subject from car maintenance to micro repair. These computations are collectively called the inference engine – a very exotic bit of jargon – which can be applied to many different subjects.

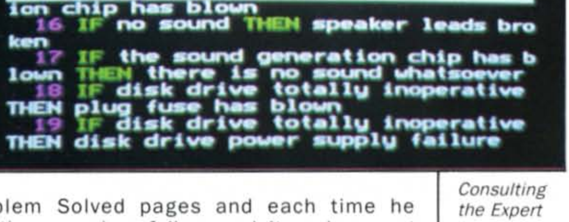
Expert shells are very popular and the program shown – Expert Shell – is one for the BBC Micro. It's the cheapest one you'll come across, so type it in and use Get it Right! to check you've made no typing mistakes. The program is quite sophisticated and incorporates the up-to-minute computational technique of backward chaining. It allows you to enter your own knowledge base, so you can build a system to meet your particular needs.

The shell given can accommodate up to 300 IF..THEN rules, which are continually shown when the program is running – so you can see what's available. If you are using an Archimedes you can extend this up to at least 3000 by changing line 40 to:

```
   40 MaxRules%=3000:Nu
mRules%=0
```

You'll have to pinpoint a particular application before you start developing your expert system. This might be a headache if you can't think of one, but my advice would be to pick a subject that interests you – like high-tech or micros.

On the monthly disc there's the beginnings of a knowledge base concerning micro breakdowns. The way to extend it is to scan through past issues of *The Micro User* reading Mike Cook's Problem Solved pages and each time he mentions a micro failure and its subsequent cause or cure, record the appropriate rules. Eventually you'll have a micro repair expert which will have lots of knowledge which it never forgets.



```
Input problem?_
```

```
ion chip has blown
  16 IF no sound THEN speaker leads bro
ken
  17 IF the sound generation chip has b
lown THEN there is no sound whatsoever
  18 IF disk drive totally inoperative
THEN plug fuse has blown
  19 IF disk drive totally inoperative
THEN disk drive power supply failure
```

Consulting the Expert

The process of collecting rules in this manner – to construct a knowledge base – goes under the sci-fi heading of *knowledge engineering*. The simplest type of rules that can be entered are those involving a single fact and conclusion. For

Turn to Page 77 ▶

SILICON VISION

SOFTWARE for the ARCHIMEDES & BBC

SolidCAD — £49.95 (ARC & BBC) New

The ultimate 3D Draughting System for Architectural design, Interior design, Engineering Design and Teaching CDT. Allows drawing in plan, front & side elevations and also directly in 3D view. Includes powerful zoom & pan options for precision draughting and surface definition for creating Solid colour objects. Also includes Sweep, Extrude & Macro facilities for designing very complex objects easily. Designs created with SolidCAD are compatible with the Realtime Graphics Language for high-speed flicker-free animation. The custom Archimedes version also performs smooth shading for realism. SolidCAD (Arc) users can upgrade to the Realtime Solids Modeller (Arc) for £40.00.

Realtime Solids Modeller — £89.95 (ARC) New

The package includes both the sophisticated design environment of SolidCAD and the high speed animation capability of a Realtime Graphics Language (RGL) module developed in pure ARM risc code for supercharged performance. The package is ideal for Architectural design, Interior design, Engineering design & teaching CDT. The RGL module can be used to create standalone flicker-free animation of designs from your own programs. Smooth shading is also performed for realistic images. Through our in-house expertise in 3D Design and High peed techniques, no other package can rival the design environment & animation speed of the Realtime Solids Modeller.

ARC-PCB — £195.00 (ARC) New

The ultimate PCB design system developed specifically for the Archimedes with a specification that cannot be matched. Includes Automatic routing, Rats-nesting, 8 layers, Surface mount capability, 0.001" resolution, 32"x32" maximum board size, On-line Help, Fast Zoom/Pan/Redraw, Text & Silkscreen facility, Variable Line/Pad/Text/Grid sizes, Part Libraries, Block Move/Copy/Rotate/Mirror/Erase options, and up to 120,000 components. For hardcopy, the system supports a large number of plotters and ordinary Epson compatible printers at very high resolutions (1920 x 1024) of 240 dots/inch for near laser quality output. An entry-level ARC-PCB system (without auto-routing) is available for £99.95 (Auto-routing upgrade: £100). Enquire about our turnkey PCB design systems complete with Colour Archimedes and /or plotters with prices from £1350 to £3909 (Inc VAT).

Realtime Graphics Language — £49.95 (BBC)

The Realtime Graphics Language rom provides a complete 3D Solids/Wireframe animation system with 52 star commands and 3D Editors for designing objects to animate from your own programs. Includes a 35,000 pixels/sec line generator for fast 3D drawing rates, 3D Rotate, Scale, Orbit, Perspective and Turtlegraphics. Also compatible with designs created with SolidCAD (BBC)

RiscBASIC — £99.95 (ARC) New

Supercharge your Archimedes Basic programs by compiling them automatically into pure ARM risc code with the RiscBASIC compiler. Features include Relocatable modules, Cross reference of all variables, functions and procedures, Floating point and Integer support, Standalone code generator, Optimsing compiler & Full runtime error handler.

RiscFORTH — £99.95 (ARC) New

A new 32-bit implementation of the FORTH-83 standard, designed to take full advantage of the ARM architecture. Features include Multitasking, Optimising compiler, built-in ARM assembler with floating point mnemonics, built-in Full screen Editor, File system interface, OS calls support, Floating point & Integer maths, WIMP support, Single-step debugger, Shadow screen for documentation, Block manipulation, Dictionary & Vocabulary display, Call finding and a standalone code generator.

Super-Dump — £15.95 (BBC), £24.95 (ARC) New

The ultimate printer driver which takes advantage of the highest resolution capability of ordinary Epson compatible printers to provide 1920x1024 resolution. Images can also be scaled, positioned and previewed before printing. Fully compatible with SolidCAD, Realtime Graphics Language, Gate-Array design system & 3D CAD/Animation system. Your graphics programs or other CAD packages can be made compatible with Super-Dump by the addition of a few simple commands. An example program is included in the package.

Presentation Manager — £34.95 (BBC), £49.95 (ARC) New

The package provides an interactive environment to create, edit and play-back computer controlled presentations for lectures and demonstrations. Also handles graph plotting for polynomials & user-defined functions which can be incorporated within the presentations.

Gate-Array Design & Teaching System — £49.95 (BBC), £89.95 (ARC) New

The system provides an introductory course for Silicon chip design with facilities for Array Design, Cell Design, On-line Help and a tutorial on integrated circuit design. The package is ideal for teaching purposes and provides a low cost entry system for learning chip design skills. Compatible with Super-Dump for hardcopy. Plotter drivers are optional at £19.95.

3D CAD/Animation System — £15.95 (BBC), £19.95 (ARC-65 Arthur)

A complete 3D design and Animation system for wireframe objects. Provides an Editor, Sweep generator, Macro facility and an applications option for animating designs from your own Basic programs. This is an ideal entry level package from which to upgrade to our more powerful Solid Modelling systems. Compatible with Super-Dump. Plotter drivers are optional at £15.95.

All prices include VAT and Carriage (Overseas orders add £4)

SILICON VISION LTD., SIGNAL HOUSE, LYON ROAD, HARROW, MIDDX, HA1 2 AG.
Tel: 01-422 2274 or 01-861 2173. Fax: 01-427 5169. Telex: 918266 SIGNAL G
(Access/Mastercard/Eurocard accepted)

◀ *From Page 75*

instance, under fault diagnosis, if you know that when the *screen is fuzzy* then *the monitor lead is incorrectly plugged in* you can write:

```
IF screen is fuzzy THEN the
 monitor lead is incorrectly
 plugged in
```

Selecting the option *Edit* and, when prompted for a rule number, just pressing Return the program automatically brings up the next free rule. Type in the IF condition followed by Return and then the conclusion. You don't have to worry too much about style: Any leading or trailing spaces are taken out and all letters are converted to lower case.

You'll now see that your new rule is included in the scrolling list at the bottom – you can always press Control+Shift to stop it.

To change an existing rule enter its number when prompted and it will be printed in the window. Then type in the modified rule as before; you can use the cursor and copy keys if you only want to make minor changes.

Any single fact might have a number of conclusions: *Screen is fuzzy* could be the result of a number of things, like a video circuit blowing, a monitor fault, a damaged socket and so on. Expert Shell can cope with any number of alike facts and will list the possibilities, but its input parser can't handle a situation like this:

```
IF screen is fuzzy THEN ...
IF fuzzy screen THEN ...
```

So related rules must have identical conditions.

To make an enquiry use the *Expert* option and type in your problem – again due to the primitive parser you have to type in something which exactly matches a condition. After you press Return the program searches through and lists all the conclusions related to the problem.

You then have the option to investigate further, and this is where the true power of the expert system comes into play. Rather than just regurgitating conclusions of IF...THEN statements – which would be pretty moronic by anyone's standards – Expert Shell relates rules by backward chaining – alike facts and conclusions of different rules are chained together in an effort to get to the root of a problem.

For example, if you entered two rules like:

```
IF screen snowy THEN video circuit fault
IF video circuit fault THEN short circuit
```

clearly, the conclusion of the first rule is the same as the fact of the second. A program which did not backward chain would mindlessly ignore one of these but Expert Shell allows you to select

Turn to Page 78 ▶

> Expert Shell relates rules by backward chaining

STACK COMPUTER PRODUCTS

DIGIMOUSE

- BRITISH MADE
- 100% AMX COMPATIBLE
- UNIQUE LINEAR AXIS LOCK

£29.95

A) MODEL B/B+/MASTER 128 B) COMPACT

WITH MOUSEPAINT CASSETTE

£29.95

- UNIQUE THUMBWHEEL
- ANALOGUE MECHANISM
- COLOUR SOFTWARE & DUMP TAPE

ANAMOUSE (ELECTRON +1)

- MOUSEPAINT (CASS) £10
- GRAFIK (CASS) £10
- WHISKER (CASS) £5

✻ALL THREE TAPES £15

SPECIAL OFFER:-
• MOUSE & 3 TAPES

£39.95

ILLUSTRATOR GRAPHICS SOFTWARE

THIS HAS EVERYTHING

- LIBRARY OF DESIGNS
- ICONS,BRUSHES,PATTERNS, FONTS & DESIGN YOUR OWN
- PULL DOWN MENUS & WINDOWS
- DUMP IN 4 SIZES AND DENSITIES

BBC DISK

£19.90

CHAUFFEUR MOUSE DRIVER UTILITY

(NEEDS 16K SIDEWAYS RAM)

✻ADAPTS NON-MOUSE SOFTWARE TO USE MOUSE

- 16K SIDEWAYS ROM IMAGE ON DISK
- EASY TO USE

£9.90

B/B+/MASTER 128

GRAFIK MOUSE PACKAGE

- INTRODUCTION TO CAD
- FULL COLOUR SCREEN DESIGN
- MODE CHANGING
- PRINTER DUMPING

A) BBC B/B+/MASTER 128 **£10**
B) CHAUFFEUR & GRAFIK **£14.95**
(Compact only)

SLOMO SPEED CONTROLLER

- **SLOWS PROGRAM/SCREEN**
- **SLOWS LISTINGS**
- **LEARN GAMES AT YOUR OWN RATE**
- **IDEAL FOR THE HANDICAPPED**

£14.95

B/B+/MASTER 128 (STATE MODEL)

LIGHTPEN PACK

- VERY ACCURATE
- TOUCH SWITCH
- TAPE OR DISK 5¼
- LIGHTWRITER DRAW SOFTWARE & 10 PEN GAMES

B/B+/MASTER 128
(Not Compact or Electron)

£18

SUPERDRAW PEN ART NEW!

- 5 MENU ICON DRIVEN
- FULL COLOUR DRAWING & PAINTING
- CUT & PASTE, CIRCLE, FILL, TEXT LINE, BOX, TEXT, LOAD, SAVE ETC.
- PICTURE PRINTING INCLUDED

B/B+/MASTER 128(5¼" disk only) **£10**

✻SPECIAL PEN PACK & SUPERDRAW **£25**

SAFETY DUSTCOVERS

- FROSTED, BLACK TRIMMED, ANTI-STATIC

(Sample List)

ELECTRON	£2.50
ELECTRON +1	£3.50
B/B+/128	£2.00
COMPACT	£3.00
½ HEIGHT DISK DRIVE	£2.00
TWIN (STACKED D.D.)	£3.00
12" MONITOR/TV	£5.00
14" MONITOR/TV	£6.00

QUALITY PRINTER RIBBONS

(Sample List)

TAXAN/CANON/1080 etc.	£3.11
CENTRONICS 150/M1009	£3.29
CITIZEN 120D	£4.49
EPSON LX80	£3.29
EPSON RX80 etc.	£3.29
MICROLINE 182/192/193	£6.90
SEIKO GP100	£2.59
SEIKO SP1000	£6.82

FULL RANGE IN CATALOGUE

SUPPLIES

ALL DISKS WITH ENVELOPES, LABELS ETC IN PLASTIC LIBRARY CASE

5.25" 40T DS	£6.00 (10)
5.25" 80T DC	£8.50 (10)
3.5" Single Sided	£14.00 (10)
3.5" Double Sided	£14.00 (10)
100 CAP 5.25" LOCKABLE BOX	£10.50

STAR BUYS SAVE £'s

ANY MOUSE & LIGHTPEN PACK & SUPERDRAW	£44.95
DIGIMOUSE & ILLUSTRATOR	£44.95
40 DISK LOCKABLE BOX WITH 40 3.5" DS DISKS	£46.95

16K SIDEWAYS RAM

TO SUIT CHAUFFEUR
INCLUDES COPY DISK
& PRINT BUFFERING

£15

ARCHIMEDES

CENTRONICS PRINTER LEAD	£5.95
DUSTOVER SET	£10.00

PRICES INCLUDE VAT.
POSTAGE 90p (FREE OVER £20)
OVERSEAS £3
FREE CATALOGUE WITH ORDER OR ON REQUEST

MEEDMORE LIMITED
28 Farriers Way, Netherton
Merseyside L30 4XL
Tel: 051-521 2202

VISA

◄ From Page 77

an item from its initial list and backward chains through the whole knowledge base.

When going through this problem analysis the program lists each item in the chain, indenting further to the right the deeper it gets. In order to make your own knowledge base really useful you should always try and put tests and checks into the conclusions.

So put on your knowledge engineer hat and get typing – and if you produce an interesting knowledge base send it to us and we'll consider publishing it for you.

```
   10 REM Expert Shell
   20 REM By Francis Botto
   30 REM (c) The Micro User
   40 MaxRules%=300:NumRules%=0
   50 DIM rule$(2,MaxRules%),buf&100
   60 B%=0:X%=19:file$=""
   70 spc$=STRING$(4," ")
   80 ON ERROR IF ERR=17 ELSE REPORT:PRI
NT" at line ";ERL:END
   90 REPEAT MODE7
  100 VDU23,1,0;0;0;0;
  110 PROCscreen
  120 option=FNcommand
  130 VDU23,1,1;0;0;0;
  140 VDU28,0,13,39,5,12
  150 IF option=2 PROCedit
  160 IF option=3 PROCinference
  170 IF option=4 PROCload
  180 IF option=5 PROCsave
  190 UNTIL option=1
  200 CLS:END
  210 :
  220 DEF PROCscreen:VDU26,12
  230 VDU26,12,151,157,129
  240 VDU13,10,151,157
  250 PRINTTAB(3,0)"Expert System"
  260 PRINTTAB(31,0)CHR$130"F.Botto"
  270 PRINTTAB(3,1)CHR$132"Commands:";
  280 PRINTCHR$129"[ ] cursor keys + Ret
urn"
  290 PRINTTAB(0,3)CHR$129SPC3"Quit"SPC4
"Edit"SPC2"Expert"SPC2"Load"SPC3"Save"
  300 IF file$="" f$="Unnamed" ELSE f$=f
ile$
  310 VDU31,0,14,151,157,133:PRINT"Knowl
edge base - "f$
  320 VDU31,X%,4,ASC"^":ENDPROC
  330 :
  340 DEF FNcommand
  350 REPEAT I%=0
  360 IF INKEY-122 IF X%<36 I%=+1
  370 IF INKEY-26 IF X%>4 I%=-1
  380 IF I%<>0 VDU31,X%,4,32:X%=X%+I%:VD
U31,X%,4,ASC"^"
  390 PROCdisplay_rules
  400 UNTIL INKEY-74
  410 REPEAT UNTIL NOT INKEY-74:*FX15
  420 PROCsound
  430 IF X%>3 IF X%<9 =1
  440 IF X%>11 IF X%<16 =2
  450 IF X%>17 IF X%<24 =3
  460 IF X%>25 IF X%<30 =4
  470 IF X%>32 IF X%<37 =5
  480 =0
  490 :
  500 DEF PROCedit
  510 INPUT"Rule number:"C$
  520 IF C$="" C$=STR$NumRules%
  530 C%=VALC$:IF C%>NumRules% C%=NumRul
es%
  540 CLS:IF C%<NumRules% PRINTFNrule(C%
) ELSE PRINT"Rule:";C%
  550 INPUTLINE"IF ",I$,"THEN ",T$
  560 I$=FNs(FNc(I$)):T$=FNs(FNc(T$))
  570 IF I$="" OR T$="" ENDPROC
  580 rule$(1,C%)=I$:rule$(2,C%)=T$
  590 IF C%=NumRules% NumRules%=NumRules
%+1
  600 ENDPROC
  610 :
  620 DEF PROCinference
  630 INPUT"Input problem",A$
  640 A$=FNs(FNc(A$)):IF A$="" ENDPROC
  650 VDU28,0,24,39,5,12
  660 PRINTCHR$130"Problem:"CHR$131A$
  670 PRINTCHR$129"Possible leads..."
  680 FOR S%=0 TO NumRules%-1
  690 IF FNinstr(rule$(1,S%),A$)=1 PRINT
SPC1rule$(2,S%)
  700 NEXT
  710 INPUT'"Which to investigate furthe
r",A$
  720 A$=FNs(FNc(A$)):IF A$="" ENDPROC
  730 PROCbacktrack(A$,0)
  740 PROCspace:ENDPROC
  750 :
  760 DEF PROCbacktrack(A$,D%):LOCAL L%
  770 IF FNinstr(rule$(1,L%),A$)=0 THEN
800
  780 PRINTSPCD%"-"rule$(2,L%)
  790 PROCbacktrack(rule$(2,L%),D%+1)
  800 L%=L%+1:IF L%<NumRules% THEN 770
  810 Z%=INKEY50:ENDPROC
  820 :
  830 DEF FNc($buf):LOCAL L%,B%
  840 FOR L%=0 TO LEN$buf-1:B%=buf?L%
  850 IF B%>ASC"A"-1 IF B%<ASC"Z"+1 B%=B
%+32
  860 buf?L%=B%:NEXT:=$buf
  870 :
  880 DEF FNinstr(A$,B$)
  890 IF LENA$<LENB$ =0
  900 =INSTR(A$,B$)
  910 :
  920 DEF FNs($buf):LOCAL L%
  930 IF ?buf=32 REPEAT $buf=$(buf+1):UN
TIL ?buf<>32
  940 L%=LEN$buf:IF L%>0 IF buf?(L%-1)=3
2 REPEAT L%=L%-1:UNTIL buf?(L%-1)<>32:bu
f?L%=13
  950 =$buf
  960 :
  970 DEF PROCload
  980 VDU28,0,24,39,5,12:*CAT
  990 INPUT'"Knowledge base title",f$
 1000 IF f$="" ENDPROC ELSE V%=OPENIN f$
 1010 IF V%=0 PROCerror("Not on this dis
c"):ENDPROC
 1020 INPUT#V%,NumRules%
 1030 FOR rule=0 TO NumRules%-1
 1040 INPUT#V%,rule$(1,rule)
 1050 INPUT#V%,rule$(2,rule)
 1060 NEXT:CLOSE#V%:file$=f$:ENDPROC
 1070 :
 1080 DEF PROCsave
 1090 VDU28,0,24,39,5,12:*CAT
 1100 INPUT"Knowledge base title",f$
 1110 PRINT NumRules%-1" rules"
 1120 V%=OPENOUTf$
 1130 PRINT#V%,NumRules%
 1140 FOR rule=0 TO NumRules%-1
 1150 PRINT#V%,rule$(1,rule)
 1160 PRINT#V%,rule$(2,rule)
 1170 NEXT:CLOSE#V%:ENDPROC
 1180 :
 1190 DEF PROCdisplay_rules
 1200 B%=B%+1:IF B%=NumRules%+1 B%=0
 1210 VDU28,1,24,39,15
 1220 PRINTTAB(0,9)FNrule(B%)
 1230 VDU26:ENDPROC
 1240 :
 1250 DEF FNrule(R%)=CHR$133+RIGHT$(spc$
+STR$R%,3)+CHR$130+"IF"+CHR$135+rule$(1,
R%)+CHR$130+"THEN"+CHR$135+rule$(2,R%)
 1260 :
 1270 DEF PROCsound:LOCAL S%
 1280 FOR S%=100 TO 150 STEP 50
 1290 SOUND 1,-5,S%,2:NEXT:ENDPROC
 1300 :
 1310 DEF PROCerror(e$):PROCsound
 1320 PRINTe$:PROCspace:ENDPROC
 1330 :
 1340 DEF PROCspace
 1350 PRINT"Press space...";
 1360 REPEAT UNTIL GET=32:PRINT:ENDPROC
```

Get it right!

```
  10 =    0 0 | 240 = 40E0 A | 470 = 77FC D | 700 = 2C83 1 |  930 = 30ED 5 | 1160 =  E22 9
  20 =    0 0 | 250 = 38A8 7 | 480 = 459A 3 | 710 = 460D E |  940 = E6FC B | 1170 = BE6B C
  30 =    0 0 | 260 = 3D2B 0 | 490 = 9719 1 | 720 = C56E 4 |  950 = DEEC C | 1180 = 9719 C
  40 = F18B B | 270 = 926C 7 | 500 = C824 6 | 730 = FBA4 2 |  960 = 9719 3 | 1190 = 79BE 3
  50 = 34EE 6 | 280 = C5FF 4*| 510 = F75E 4 | 740 = DD1D 0 |  970 = 503A 5 | 1200 = 8745 B
  60 = C400 C | 290 = E823 F | 520 = F695 0 | 750 = 9719 5 |  980 = 34F6 8 | 1210 = F12D A
  70 = 7F80 B | 300 = 23DC 7 | 530 = ED11 E | 760 = 2D03 5 |  990 = 44C7 C | 1220 = 3688 E
  80 = 63B8 5 | 310 = DE65 5 | 540 = DE48 C | 770 = B4F3 9 | 1000 = 151C D | 1230 = EF20 D
  90 = 2F32 3 | 320 = 31BA 2 | 550 = 71C9 2 | 780 = 406C C | 1010 = 4836 7 | 1240 = 9719 6
 100 = 1E64 7 | 330 = 9719 1 | 560 = 5175 D | 790 = EC7F F | 1020 = F33E 5 | 1250 = 99A7 7
 110 = 9538 0 | 340 = A5D6 4 | 570 = DC98 0 | 800 = DCF1 3 | 1030 = AAE9 C | 1260 = 9719 6
 120 = 6233 F | 350 = 6F4E B | 580 = C445 D | 810 = 993F 8 | 1040 = 2501 C | 1270 = 6F31 6
 130 = 59B7 7 | 360 = 9C79 A | 590 = 518E 9*| 820 = 9719 C | 1050 = FD83 7 | 1280 = 1488 F
 140 = E198 3 | 370 = 9FBC A | 600 = ED0F 4*| 830 = C9F7 3 | 1060 = CA74 6 | 1290 =  FC7 2
 150 = BAB9 6 | 380 = B555 8 | 610 = 9719 B | 840 = 9B70 C | 1070 = 9719 1 | 1300 = 9719 6
 160 = C660 D | 390 = 7A8A E | 620 = 6309 1 | 850 = 1BB9 9 | 1080 =  EB7 F | 1310 = 9EF2 0
 170 = 8382 C | 400 = 34E6 E | 630 = 3926 8 | 860 = CB4B 4 | 1090 = 34F6 7 | 1320 = 187A 7
 180 = 656E 3 | 410 =  CF6 0 | 640 = C56E 7 | 870 = 9719 7 | 1100 = B909 6 | 1330 = 9719 6
 190 = 6E19 C | 420 = 536B 4 | 650 = E1FC E | 880 = 7589 1 | 1110 = 99D1 6 | 1340 = 6B8B 8
 200 = 8215 1 | 430 = A2D4 1*| 660 = 5969 0 | 890 = 4A9C E | 1120 = A00E D | 1350 =  87F F
 210 = 9719 0 | 440 = BA75 6 | 670 =  63F 1 | 900 = 1629 1 | 1130 = A5C3 3 | 1360 = DD18 0
 220 = B028 F | 450 = A2D0 7 | 680 = 39F4 3 | 910 = 9719 9 | 1140 = AAE9 F |
 230 = 13DF 1 | 460 = 7BD8 0 | 690 = B3F2 2 | 920 = 8A57 A | 1150 = D6A0 9 |
```

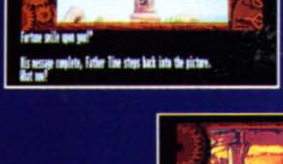
Time and magik

The trilogy

Interactive fiction from Level 9

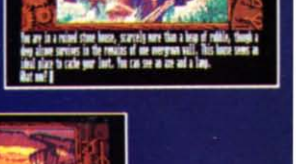
Three of Level 9's most acclaimed adventures – Lords of Time, Red Moon and The Price of Magik – come together in one package. Each has been enhanced and enlarged with more text than ever before – 60,000 mind-expanding words creating magik and mystery round every corner. There's a powerful new parser, and most disc versions include stunning digitised pictures that help to dramatically heighten the atmosphere.

> "Three excellent games...the adventure bargain of the year" – *Your Amiga, June 88.*
> "Each is a classic – so buy it". – *ST Update, July 88.*

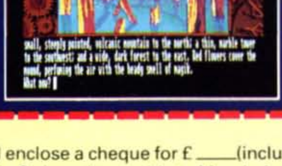


Fortune smile upon you!"

His message complete, Father Time steps back into the picture.
What now?



You are in a ruined stone house, scarcely more than a heap of rubble, though a deep alcove survives in the remains of one overgrown wall. This house seems an ideal place to cache your loot. You can see an axe and a lamp.
What now?



small, steeply pointed, volcanic mountain to the north; a thin, marble tower to the southwest; and a wide, dark forest to the east. Red flowers cover the mound, perfuming the air with the heady smell of magik.
What now?

Screen shots from Atari ST version

Please tick the format you require:

£14.95	Tape	Disc
Spectrum 48k/128k		
Commodore 64/128		
Amstrad CPC		
Amstrad CPC, PCW, Spectrum Plus 3		
Atari XL/XE*		
MSX 64k		
Apple II*		
BBC Master (80 track)		

£19.95	Disc
Atari ST	
Commodore Amiga	
Amstrad PC and PC compatibles	
Macintosh	

Tape versions come with three cassettes in every package

** Text only*

Dealers: Ring Diane O'Brien on 0625 878888 for your *free* Mandarin Software information pack

MANDARIN SOFTWARE

☐ I enclose a cheque for £ ____(including VAT and p&p) made payable to Mandarin Software

☐ Please debit my Access/Visa card no:

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date: __ / __

Signature____________________

Name____________________

Address____________________

____________________ Postcode__________

SEND TO: **Mandarin Software, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

Enquiries: 0625 879940

Order Hotline: 0625 879920

TECHNOMATIC

17 Burnley Road, London NW10 1ED. Tel: 01-208 1177 Fax: 01-452 1500
305 Edgware Road, London W2. Tel: 01-723 0233 Telex: 922800

ARCHIMEDES, BBC COMPUTERS & ECONET REFERRAL CENTRE

ARCHIMEDES

System	Basic	Mono	Colour
305	£685	£735	£885
310	£799	£855	£999
310M	£859	£919	£1085
440	£2399	£2459	£2625

Ask for our list of Arc Add-ons and software.

Buy a Model 310 or 440 from us and we'll offer you

EITHER

A voucher worth £100 before VAT redeemable against any future purchase from us

OR

Auto Sketch CAD Program **£79,**
Inside AutoSketch Book **£15**
and two packets of 3M 3.5″ Discs **£26**

AND

5% discount on any Archimedes add-ons
10% discount on any Archimedes software purchased at the same time.

BBC MASTER

BBC Master AMB15 £356(a)
We include free Educational/Fun Bundled software from BBC Publications range (RRP £40) and a STARdataBASE package worth another £40

MASTER SUMMER SPECIAL

Master AMB15+512 Co-Processor for only **£420(a)**

(Allow £5 extra if you would like us to fit the card for you)

512 upgrade includes 80186 processor with 512K RAM, DOS+, GEM Suite (Desk Top, Paint & Write) and Mouse

This offer valid while stocks last.
Ask for list of DOS software compatible with 512.

WINCHESTER DRIVES

TECHNOMATIC Winchester range covers drives from 20Mb to 70Mb capacity and are available in various combinations with floppy drives and tape streamers.

The Winchester Drives are supplied formatted and are ready to connect to the computer fitted with an appropriate disc filing system.

For the Master users we supply a front end utility which displays the total contents of the drive in icon format and enables you to load any file from there.

To be launched soon technoCAD

The most comprehensive CAD system for the Master. Host of innovative featurs for creating complex drawings, pcb layouts, sketches etc. Virtually no restrictions on drawing sizes. One screen scaling for plotters, variety of screen dumps for compatible printers

FREE

evaluation disc available on request. The disc contains operating instructions and will perform as release version except for file functions.

ACORN 512

80816 Co-Processor includes DOS+, GEM Suite (Desk Top, Paint & Write) and Mouse for only **£90**

MONITORS

A range of monochrome, colour and multisync monitors.
New additions to the range are:

Philips 7752 14″ green screen monitor featuring: Flat Screen, reverse video, separate brilliance and contrast controls. Ideal for DTP/CAD/Word Processor applications **£85(a)**

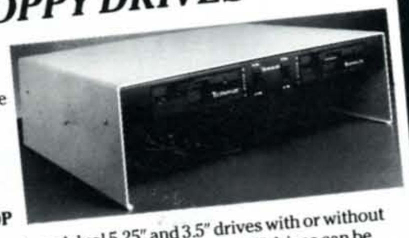
NEC Multisync II 14″ Suitable for Archimedes and PC compatibles **£479(a)**

Philips CM8833 14″ RGB monitor that provides full versatility. Compatible with all BBC models, Archimedes and PC Compatible systems and video recorders. Mono/Colour switch, Sound Input **£219(a)**

For details on rest of our range please ask

FLOPPY DRIVES

A range of reliable, well constructed, attractively packaged floppy drives. The quality and reliability of these drives enables us to offer a two year warranty on all our floppy drives.



PD800P

The range comprises of single and dual 5.25″ and 3.5″ drives with or without integral power supply. All connecting cables included. 5.25″ drives can be switched for 40 and 80 track operation.

PRINTERS

A wide range of printers and plotters available from stock at competitive prices. Following are our typical prices:

Epson LX 800 £179(a) **LQ500 £279(a)**
National Panasonic KXP1081+ Master printer Lead and our Wysiwyg+ROM £145(a)

Ask for our full range of printers, plotters and accessories

ECONET ACCESSORIES

Full range of Accessories are available from stock.

Acorn E01/E20 File Store with dual 3.5″ drives and a 20Mb Winchester **£999(2×a)**

SOFTWARE

Our software range for Archimedes and all BBC models includes: Language, Productivity, Applications and Educational packages.

It is not possible to include details of our complete range of products. Please complete the coupon or phone for our comprehensive catalogue.

We accept orders from Government, Educational and national organisations. Orders can also be placed by sending the appropriate remittance or with VISA/ACCESS cards. For fast delivery phone 01-208-1177.

Prices do not include carriage or VAT.
Carriage code. (a) £8.00 (b) £2.50 (c) £1.50 (d) £1.00

Please send me your catalogue

NAME________________

COMPANY________________

ADDRESS________________

____

MU11

STEPPER MOTOR CONTROLLER

This ROM based software allows you to "talk" direct to two Stepper Motors and a Relay in BASIC via 20 *new* "star" commands. It is widely used for DIY plotters, turtles and computer control (CNC) of small machine tools. No machine code is now necessary for any of these projects.

ROM with handbook & fitting instructions £ 14.95 inc. P & P.

INTERFACING ?

We have Interfaces available ex-stock for many purposes including Stepper Motors, Lamps, Relays and small DC motors. 9 output lines so you can control two stepper motors and a relay from the User Port. Up to 9 relays can be added for controlling mains devices. Full user information included with each.
VERSION 1. Powered from BBC auxiliary power supply. £ 23.00 inc. P & P.
VERSIONS 2 & 3. With integral mains Power supply (optically isolated).
(2) 300mA per coil £ 49.00 (3) 800mA per coil £ 57.46 inc. P & P.
HI-POWER VERSIONS. High output for stepper motors or other uses.
Up to 3 or 5 Amps per line. Needs a separate power supply (See below).
3 Amp £ 42.50 P & P £ 3.00. 5 Amp £ 65.00 P & P £ 3.00.

POWER SUPPLIES for high current stepper motors etc. Custom voltages.
100 or 200 VA versions. £ 62.00 or £ 69.70 Post & packing £ 3.00.

SCRAPBOOK

A free-format storage & retrieval system for all types of information including colour and graphics. Incorporates screen designers and facilities to search, sort, browse, print, extract etc. Forget fields, records etc. Store information as you want to read it - on the screen. Store up to 320 Teletext screens on a disc. Do automatic 'slide show' type presentations.
Disc and manual £ 12.95 inc. P & P.
Please indicate 40/80 track and whether SS/DS drive available.
SCRAPBOOK DEMONSTRATION disc £ 1.25 inc. P & P.

Instant On-Screen Help

All BBC models can have On-Screen help with our range of ROMs and Discs. Why thumb the handbook when you can have the important details on screen even when wordprocessing ?

WORDWISE COMPANION

For Computer Concepts Wordwise and Wordwise Plus wordprocessors.

BASIC COMPANION

Instant help for getting to grips with BASIC programming.

PROGRAMMERS COMPANION

Colours, Graphics, Sounds, VDU codes, ASCII codes, *FX commands etc.

MACHINE CODE COMPANION

Assembly language. OS routines, 6502 Instructions, Addressing, Vectors etc.
Each ROM gives you instant access to 15 screens of help via one simple command.
ROM with simple fitting instructions £ 19.95 inc. P & P.
Custom versions containing a mixture of our helpscreens or your own special data (E.g. Printer Codes) £ 5.00 extra.
All Companions are also available as ROM IMAGES on disc for loading into sideways RAM. £ 8.95 each or £ 19.95 for all four inc. P & P.
Disc versions of Basic, Programmers and Machine code Companions.
£ 9.95 each or all three £ 19.95 inc. P & P.
COMPANIONS DEMONSTRATION disc £ 1.25 inc. P & P.

Access

MICRO HELP

VISA

5 Hill Terrace, LLANDUDNO, Gwynedd. LL30 2LS. Telephone (0492) 76925

FAX

British Telecom CF9	Call
Sanyo Sanfax 2	Call
Canon F110	£1275

DOT MATRIX PRINTERS

BROTHER	
M1409	£345
M1509	£399
CANON	
A-55	£395
A-65P	£475
EPSON	
LX800	£225
FX1000	£465
LQ500	£325
PANASONIC	
1540	£575
STAR	
ND10	£255
NX15	£275
MANNESMANN TALLY	
MT80	£175
MT85	£286

DAISY WHEEL PRINTERS

QUME	
12/20	£295
12/45	£595
JUKI	
6100	£275
6200	£399
PANASONIC	
3131P	£245
3151P	£395
MICRO-P	
M26P	£215
BROTHER	
HR20	£365
HR25XL	£565

LASER PRINTERS

BROTHER	
HL8	£1825
CANON	
LPB-811	£1750
EPSON	
GQ3500	£1395
HEWLETT PACKARD	
HPLJ+	£2995
HPLJ2	£1850
OKI	
L/L6	£1450
PANASONIC	
4450	£1995
STAR	
LASERP 8	£1699
TEXAS INSTRUMENTS	
TI 2015	£3775
TI 2108	£3595
TI 2115	£4950
MANNESMANN TALLY	
MT910	£2495

SPECIAL OFFERS

Star LC 10	£195
Star LC 10Col	Call
Panasonic 1081	£139
Star LC 24-10	£325
Panasonic 1592	£299
Panasonic 1595	£345
NEC P2200 Pinwriter	£269

Ex-Demo Equipment
Printers, Monitors, Software etc. . . call for details

PRICES ARE CASH WITH ORDER and Exclude Delivery and VAT
All Goods Covered by Manufacturers Warranty

MICROSOL Ltd

01-739 5607

1-4 Christina Street London EC2A 4PA.

Check your Leaky Listing corrections

HERE are the corrections that you should have made to the Leaky Listings on Page 119 of last month's issue of *The Micro User*. You may think that we put the first error in the first line when we mised the brackets from around the 10:

```
DIMW$(N),S%10
```

but there is no mistake here – it reserves 10 bytes of memory and has a completely different meaning to a DIM with brackets which reserves array elements.

However there is a mistake before that – we set *N* to five when, in fact, there are six items of data to be read in. Either the five needs changing to a six or an item needs leaving out. This is not a fatal error, but PRINTER would never be used.

The next mistake is in line 50 where we seed the random number generator. A negative value should be used so the line should read:

```
50 X%=RND(-TIME)
```

Again, this error wouldn't stop the program working, but each time you ran it after switching on you'd get the same sequence of words. Another annoying, but non-fatal, error is in line 60 where C% should have been set to zero – the program as it stands only gave nine guesses at letters.

A more major – but easily spotted – mistake is in line 170 where *G%* should be *G$*. Finally, the AND in line 200 should have been an OR.

If you think we missed something out of line 220:

```
220 IFR% PRINT...
```

you're wrong. You don't need an actual condition following an IF statement and it's taken as an implied =TRUE. So line 220 could have been written:

```
220 IFR%=TRUE PRINT...
```

Now let's look at ways in which the program could be improved. First, the presentation could be much better: Although there are no graphics you could make use of colour, lay the screen out better and switch the cursor off. Also indirection operation in line 150 would have been better written as:

```
S%?(P%-1)
```

and all the variables could have had much more meaningful names.

The prompt and input from the request for another go is very poor – it only accepts *Y* and you have to press Return. We're sure you'll all have improved that as you made your changes to the program.

One final point: The program counts the number of guesses, rather than the number of mistakes as you would when you draw the gallows in Hangman. So our Leaky Listing had a Leaky Specification. Remember, it's important to specify your program well: No matter how well it's written, if the ideas behind it aren't good it won't be much use.

B B+

Wordsquare solver

Geoff Turner shows how you can unscramble puzzles easily

WORDSQUARES are a popular pastime and often form a basis for competitions. A number of programs are available to help you to produce this type of puzzle – there's one in the December 1985 issue of *The Micro User* – but here's a routine that helps you solve them.

While the puzzles themselves are relatively easy to do, there always remains a nagging doubt that one or two words may have been missed – particularly when they are written perhaps upside down and diagonally across the square.

```
P R I N T J S O O K U O T O G
R L I F F A T L O G J L O F H
O Z O U U B E H P Y A T V L K
C R I T D Y P R Y V H R A S K
L V L E Q A G E D L P E P E O
E E Y G L K K A B A J P N B Y
A M E R Z N F B V M T E L D E
R T L E I V D U N W E A H A S
E N D P R O C S J D U T N H N
L Q X O X J V O G W E J X J D
S Y N R R S S G Y L R F V V J
G L P T G C L A D W K F F Q E
H I R T L Y B M I D $ S N N K
I D S I X R P E A Q H Z E K W
E R K S Q T G C E U X T N S L
```

A sample wordsquare containing 20 Basic words

```
OTO
TOG
PRINT
RINT
INTJ
NTJS
JSOO
SOOK
OOKU
OKUO
KUOT
UOTO
OTOG
PRINT
RINTJ
INTJS
NTJSO
TJSOO
JSOOK
SOOKU
OOKUO
OKUOT
KUOTO
UOTOG
```

```
TA
AE
ER
RD
DA
AT
TA
AN
NJ
JJ
TAE
AER
ERD
RDA
DAT
ATA
TAN
ANJ
NJJ
TAER
AERD
ERDA
RDAT
DATA
ATAN
```

Sample output

This program works by listing all possible words from the wordsquare in the way in which we would normally read them – left to right. Type in the listing and make sure you have not made any typing errors using Get it right! To use it, you have to enter a copy of the wordsquare into the micro.

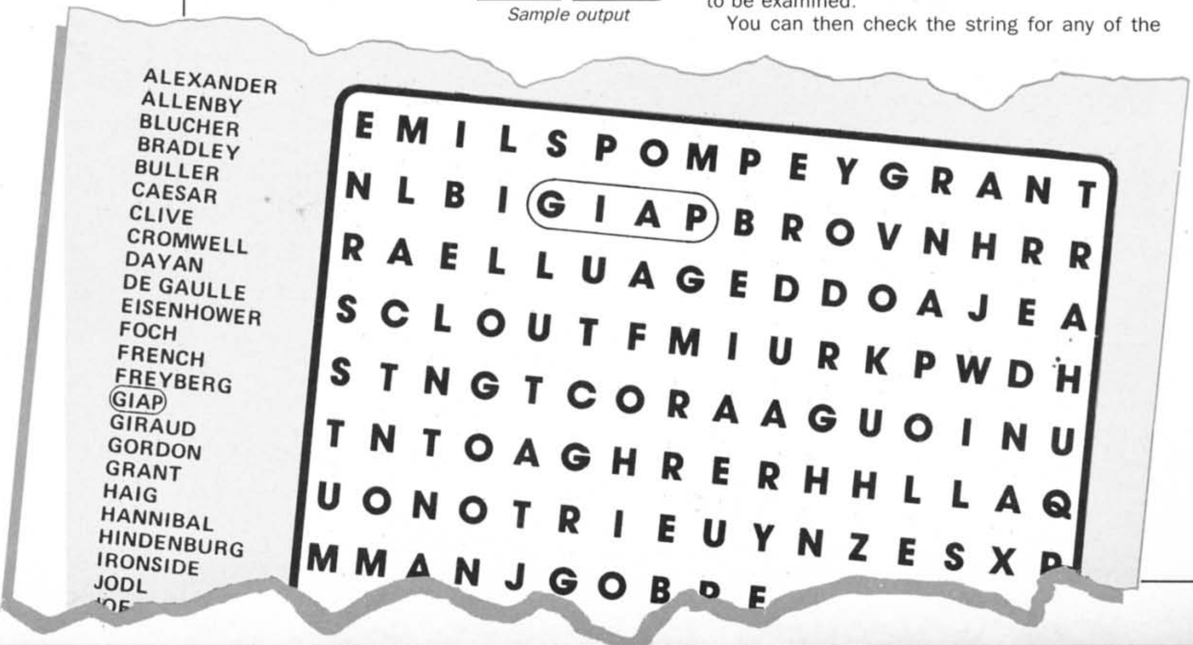
You are first asked for the dimension of the puzzle – the number of letters either across or down. The program will accept any square up to 20 characters wide, which should be large enough for the majority of puzzles.

A grid of dots representing the square is then displayed and you must then enter an exact copy of the puzzle on to the screen.

The data is entered one horizontal row at a time, and a chance to correct any wrongly entered row is given before proceeding to the next row. It is important that the data is entered correctly, so it's worth taking care to check each line thoroughly before proceeding to the next.

After the final line is entered and confirmed the program begins to unscramble the square. It does it by assembling a string from each possible line of text, first of all reading from left to right across each line of the square. This string of characters is then displayed at the top of the screen, ready to be examined.

You can then check the string for any of the



ALEXANDER
ALLENBY
BLUCHER
BRADLEY
BULLER
CAESAR
CLIVE
CROMWELL
DAYAN
DE GAULLE
EISENHOWER
FOCH
FRENCH
FREYBERG
GIAP
GIRAUD
GORDON
GRANT
HAIG
HANNIBAL
HINDENBURG
IRONSIDE
JODL

E M I L S P O M P E Y G R A N T
N L B I G I A P B R O V N H R R
R A E L L U A G E D D O A J E A
S C L O U T F M I U R K P W D H
S T N G T C O R A A G U O I N U
T N T O A G H R E R H H L L A Q
U O N O T R I E U Y N Z E S X
M M A N J G O B

hidden words before proceeding to the next line. Alternatively, the option is given to split the line. If you opt for this the program will break the line into all possible words contained within it and list them on the screen.

As an example, consider a wordsquare which contains the names of various computers. The program may extract the following:

DHRACORNGI

Readers of this magazine would have no difficulty at all in quickly spotting ACORN within this line of text. However if this had not been spotted, and the option was taken to split the line, the program would list the following words:

Length	Words
2	DH HR RA AC CO OR RN NG GI
3	DHR HRA RAC ACO COR ORN RNG NGI
4	DHRA HRAC RACO ACOR CORN ORNG RNGI
5	DHRAC HRACO RACOR ACORN CORNG ORNGI
6	DHRACO HRACOR RACORN ACORNG CORNGI
7	DHRACOR HRACORN RACORNG ACORNGI
8	DHRACORN HRACORNG RACORNGI
9	DHRACORNG HRACORNGI
10	DHRACORNGI

Every possible word contained within the original string would be listed, so it's a simple matter to pick out any hidden words. The program repeats this for all rows – left to right – before moving on to the second direction – right to left. The process is repeated:

- Left to right
- Right to left
- Top to bottom
- Bottom to top
- Diagonally left to right upwards
- Diagonally left to right downwards
- Diagonally right to left upwards
- Diagonally right to left downwards

until all possible words have been listed on the screen. Once all these have been listed you'll hopefully have extracted all the previously hidden words from the square.

PROCEDURES

setup_square	Data entry routine
clear_line	Erases a line entered in error
left	Reads left to right strings
right	Reads right to left strings
down	Reads top to bottom strings
up	Reads bottom to top strings
left_down	Reads diagonally left down strings
left_up	Reads diagonally left up strings
right_up	Reads diagonally right up strings
right_down	Reads diagonally right down strings
split_line	Splits a string into all possible words
reset	Resets counter in split_line

MAIN VARIABLES

Letter%(X,Y)	Array to store square data
D%	Dimension of square
D$	Line of text read from square
N%	Length of diagonal lines of text
X%,Y%	Horizontal and vertical offsets when reading diagonal lines
LD%	Length of *D$*

Note that when you're reading diagonally, the length of the words will vary from one letter to the maximum determined by the dimension of the square. However the program will ignore the one letter words from the four corners, as these do not need to be analysed.

The program was originally written on an Archimedes, but has been adapted to be compatible with other Acorn micros. However, the program and variables occupy most of the available memory on the Model B so any unnecessary spaces should be avoided in order to prevent a *No Room* error. You should not put a space after the line numbers – in the listing we used LISTO 1 for clarity, but there are no spaces in our copy.

```
   10 REM Wordsquare unscrambler
   20 REM By Geoff Turner
   30 REM(c) The Micro User
   40 ON ERROR GOTO 1880
   50 MODE 1
   60 DIM Letter%(20,20)
   70 COLOUR 2
   80 PRINTTAB(9,3);"WORDSQUARE UNSCRAMB
LER"
   90 PRINTTAB(9,4);STRING$(22,"=")
  100 PRINTTAB(12,6);"By Geoff Turner"
  110 PRINTTAB(12,7);STRING$(15,"=")
  120 COLOUR 3
  130 PRINTTAB(3,11);"Enter the dimensio
n of your square."
  140 PRINTTAB(10,14);"Maximum 20 letter
s !"
  150 COLOUR 1
  160 PRINTTAB(12,19);"DIMENSION = ";:IN
PUT""D%
  170 IF D%<2 OR D%>20 THEN SOUND 1,-15,
50,5:PRINTTAB(24,19);SPC(10):GOTO 160
  180 VDU 23,1,0;0;0;0;
  190 PROCsetup_square
  200 PROCleft:PROCright:PROCdown:PROCup
  210 PROCleft_down:PROCleft_up:PROCrigh
t_up:PROCright_down
  220 CLS:PRINTTAB(10,15);"ANALYSIS COMP
LETE"
  230 END
  240 DEFPROCsetup_square
  250 CLS:COLOUR 1
  260 FOR line%=1 TO D%:FOR column%=1 TO
 D%
  270 PRINTTAB(line%,column%);"."
  280 NEXT:NEXT
  290 FOR line%=1 TO D%
  300 COLOUR 2:PRINTTAB(0,line%);">":COL
OUR 3
  310 FOR column%=1 TO D%
  320 REPEAT:*FX21,0
  330 G=GET:UNTIL G>64 AND G<91
  340 PRINTTAB(column%,line%);CHR$(G);
  350 Letter%(column%,line%)=G
  360 NEXT
  370 SOUND 1,-10,100,5
```

Turn to Page 84 ▶

◀ From Page 83

```
  380 COLOUR 2:PRINTTAB(D%+3,line%);"Cor
rect ? (Y/N)"
  390 *FX21,0
  400 REPEAT:G$=GET$:UNTIL G$="Y" OR G$=
"N"
  410 IF G$="N" THEN PROCclear_line:line
%=line%-1
  420 PRINTTAB(0,line%);SPC(1);TAB(D%+3,
line%);SPC(16);
  430 COLOUR 3:NEXT
  440 ENDPROC
  450 DEFPROCclear_line
  460 COLOUR 1:FOR I%=1 TO D%
  470 PRINTTAB(I%,line%);"."
  480 NEXT
  490 PRINTTAB(D%+3,line%);SPC(16);
  500 ENDPROC
  510 DEFPROCleft
  520 CLS:FOR line%=1 TO D%
  530 COLOUR 2:PRINTTAB(0,0);"LEFT TO RI
GHT"
  540 D$="":FOR column%=1 TO D%
  550 D$=D$+CHR$(Letter%(column%,line%))
  560 PRINTTAB(19,0);D$:NEXT
  570 PROCsplit_line:NEXT
  580 ENDPROC
  590 DEFPROCright
  600 CLS:FOR line%=1 TO D%
  610 PRINTTAB(0,0);"RIGHT TO LEFT"
  620 D$="":FOR column%=D% TO 1 STEP -1
  630 D$=D$+CHR$(Letter%(column%,line%))
  640 PRINTTAB(19,0);D$:NEXT
  650 PROCsplit_line:NEXT
  660 ENDPROC
  670 DEFPROCdown
  680 CLS:FOR column%=1 TO D%
  690 PRINTTAB(0,0);"TOP TO BOTTOM"
  700 D$="":FOR line% = 1 TO D%
  710 D$=D$+CHR$(Letter%(column%,line%))
  720 PRINTTAB(19,0);D$:NEXT
  730 PROCsplit_line:NEXT
  740 ENDPROC
  750 DEFPROCup
  760 CLS:FOR column%=1 TO D%
  770 PRINTTAB(0,0);"BOTTOM TO TOP"
  780 D$="":FOR line%= D% TO 1 STEP -1
  790 D$=D$+CHR$(Letter%(column%,line%))
  800 PRINTTAB(19,0);D$:NEXT
  810 PROCsplit_line:NEXT
  820 ENDPROC
  830 DEFPROCleft_down
  840 N%=1:FOR R%=(D%-1) TO 1 STEP -1
  850 PRINTTAB(0,0);"DIAG' LEFT DOWN"
  860 X%=0:Y%=1:D$="":N%=N%+1
  870 FOR C%=1 TO N%
  880 D$=D$+CHR$(Letter%(R%+X%,Y%))
  890 PRINTTAB(19,0);D$
  900 X%=X%+1:Y%=Y%+1
  910 NEXT:PROCsplit_line:NEXT
  920 N%=D%:FOR R%=2 TO (D%-1)
  930 PRINTTAB(0,0);"DIAG' LEFT DOWN"
  940 X%=1:Y%=0:D$="":N%=N%-1
  950 FOR C%=1 TO N%
  960 D$=D$+CHR$(Letter%(X%,R%+Y%))
  970 PRINTTAB(19,0);D$
  980 X%=X%+1:Y%=Y%+1
  990 NEXT:PROCsplit_line:NEXT
 1000 ENDPROC
 1010 DEFPROCleft_up
 1020 N%=1:FOR R%=(D%-1) TO 1 STEP -1
 1030 PRINTTAB(0,0);"DIAG' LEFT UP"
 1040 X%=0:Y%=D%:D$="":N%=N%+1
 1050 FOR C%=1 TO N%
 1060 D$=D$+CHR$(Letter%(R%+X%,Y%))
 1070 PRINTTAB(19,0);D$
 1080 X%=X%+1:Y%=Y%-1
 1090 NEXT:PROCsplit_line:NEXT
 1100 N%=D%:FOR R%=(D%-1) TO 2 STEP -1
 1110 PRINTTAB(0,0);"DIAG' LEFT UP"
 1120 X%=1:Y%=0:D$="":N%=N%-1
 1130 FOR C%=1 TO N%
 1140 D$=D$+CHR$(Letter%(X%,R%-Y%))
 1150 PRINTTAB(19,0);D$
 1160 X%=X%+1:Y%=Y%+1
 1170 NEXT:PROCsplit_line:NEXT
 1180 ENDPROC
 1190 DEFPROCright_up
 1200 N%=1:FOR R%=2 TO D%
 1210 PRINTTAB(0,0);"DIAG' RIGHT UP"
 1220 X%=0:Y%=D%:D$="":N%=N%+1
 1230 FOR C%=1 TO N%
 1240 D$=D$+CHR$(Letter%(R%-X%,Y%))
 1250 PRINTTAB(19,0);D$
 1260 X%=X%+1:Y%=Y%-1
 1270 NEXT:PROCsplit_line:NEXT
 1280 N%=D%:FOR R%=(D%-1) TO 2 STEP -1
 1290 PRINTTAB(0,0);"DIAG' RIGHT UP"
 1300 X%=D%:Y%=0:D$="":N%=N%-1
 1310 FOR C%=1 TO N%
 1320 D$=D$+CHR$(Letter%(X%,R%-Y%))
 1330 PRINTTAB(19,0);D$
 1340 X%=X%-1:Y%=Y%+1
 1350 NEXT:PROCsplit_line:NEXT
 1360 ENDPROC
 1370 DEFPROCright_down
 1380 N%=1:FOR R%=2 TO D%
 1390 PRINTTAB(0,0);"DIAG' RIGHT DOWN"
 1400 X%=0:Y%=1:D$="":N%=N%+1
 1410 FOR C%=1 TO N%
 1420 D$=D$+CHR$(Letter%(R%-X%,Y%))
 1430 PRINTTAB(19,0);D$
 1440 X%=X%+1:Y%=Y%+1
 1450 NEXT:PROCsplit_line:NEXT
 1460 N%=D%:FOR R%=2 TO (D%-1)
 1470 PRINTTAB(0,0);"DIAG' RIGHT DOWN"
 1480 X%=D%:Y%=0:D$="":N%=N%-1
 1490 FOR C%=1 TO N%
 1500 D$=D$+CHR$(Letter%(X%,R%+Y%))
 1510 PRINTTAB(19,0);D$
 1520 X%=X%-1:Y%=Y%+1
 1530 NEXT:PROCsplit_line:NEXT
 1540 ENDPROC
 1550 DEFPROCsplit_line
 1560 PRINT:COLOUR 1
 1570 PRINTTAB(0,2);STRING$(40,"-")
 1580 PRINTTAB(0,29);STRING$(40,"-")
 1590 COLOUR 2
 1600 PRINTTAB(8,31);"SPLIT LINE (Y/N) ?
";
 1610 *FX21,0
 1620 REPEAT:G$=GET$:UNTIL G$="Y" OR G$=
"N"
 1630 PRINTTAB(8,31);SPC(20);
 1640 IF G$="N" THEN CLS:ENDPROC
 1650 COLOUR 1
 1660 PRINTTAB(4,31);"PRESS SHIFT KEY TO
 CONTINUE";
 1670 VDU 28,8,28,30,3
 1680 COLOUR 3
 1690 LD%=LEN(D$)
 1700 count=0
 1710 FOR L%=2 TO LD%
 1720 FOR Q%=1 TO (LD%-L%+1)
 1730 PRINT MID$(D$,Q%,L%)
 1740 count=count+1
 1750 IF count=25 THEN PROCreset
 1760 NEXT:NEXT:COLOUR 2
 1770 SOUND 1,-10,200,5:VDU26
 1780 PRINTTAB(3,31);"PRESS RETURN KEY F
OR NEXT LINE";
 1790 *FX21,0
 1800 REPEAT:G=GET:UNTIL G=13
 1810 CLS
 1820 ENDPROC
 1830 DEFPROCreset
 1840 REPEAT:UNTIL INKEY(-1)
 1850 REPEAT:UNTIL NOT INKEY(-1)
 1860 CLS:count=0
 1870 ENDPROC
 1880 CLS
 1890 COLOUR 3
 1900 REPORT
 1910 PRINT " at line ";ERL
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = B089 9
  50 = 7054 B
  60 = 63DC 4
  70 =  354 3
  80 = 31E4 1
  90 = 9431 3
 100 = 78A7 1
 110 = 26ED 2
 120 = 1375 4
 130 = 21EC E
 140 = AD65 D
 150 = 3337 6
 160 = 13F5 B
 170 = 565E F
 180 = 4515 2
 190 = FACD E
 200 = 1F86 B
 210 = 7F1A 0
 220 = A59A 2
 230 = FD2E 6
 240 = 2D54 3
 250 = AC68 1
 260 =  4A8 0
 270 = 580A 6
 280 = 24BD 1
 290 = 28E9 E
 300 = F74D 0
 310 = 4081 D
 320 = 9F9F 9

 330 = A7D2 D
 340 = 6AD9 5
 350 =  472 0
 360 = 2C83 F
 370 = 9E9C C
 380 = F0EE 9
 390 = 2B9A 2
 400 = 36B6 8
 410 = 8C2F 0
 420 = 3D5D 6
 430 = BECF A
 440 = ED0F 2
 450 =  788 C
 460 = D002 E
 470 =  629 2
 480 = 2C83 C
 490 = 1778 A
 500 = ED0F 7
 510 = 68C6 4
 520 = CF70 6
 530 = C640 8
 540 = F647 E
 550 = 235B 1
 560 = C4EC 2
 570 = 85CD 6
 580 = ED0F A
 590 = E053 6
 600 = CF70 6
 610 = 25B0 2
 620 = C86A 8
 630 = 235B 5
 640 = C4EC A

 650 = 85CD 9
 660 = ED0F 2
 670 = A9FD B
 680 = DB34 D
 690 = 3199 4
 700 = 5B76 C
 710 = 235B 3
 720 = C4EC 9
 730 = 85CD 6
 740 = ED0F C
 750 = 958C 4
 760 = DB34 B
 770 = C58C 8
 780 = 5581 1
 790 = 235B 2
 800 = C4EC 0
 810 = 85CD D
 820 = ED0F D
 830 = C7D8 B
 840 = 524B 6
 850 = 2ABA 0
 860 = 3602 D
 870 = 1E76 C
 880 = 8DD5 9
 890 = 1112 0
 900 = 7D93 F
 910 = 3258 A
 920 = A79E 2
 930 = 2ABA 3
 940 =  7EB 2
 950 = 1E76 E
 960 = 4A96 C

 970 = 1112 D
 980 = 7D93 6
 990 = 3258 E
1000 = ED0F E
1010 = 75FC B
1020 = 524B 2
1030 = 31AD C
1040 = DD7C 5
1050 = 1E76 8
1060 = 8DD5 F
1070 = 1112 A
1080 = D735 9
1090 = 3258 E
1100 = 7ED3 B
1110 = 31AD 2
1120 =  7EB 1
1130 = 1E76 A
1140 = 8713 1
1150 = 1112 5
1160 = 7D93 5
1170 = 3258 F
1180 = ED0F 4
1190 =   19 B
1200 = 7E56 E
1210 = F811 E
1220 = DD7C A
1230 = 1E76 6
1240 =  D1E 5
1250 = 1112 0
1260 = D735 8
1270 = 3258 6
1280 = 7ED3 3

1290 = F811 3
1300 = 4A69 7
1310 = 1E76 0
1320 = 8713 6
1330 = 1112 7
1340 =  E2C 2
1350 = 3258 3
1360 = ED0F 2
1370 = 9DFF 9
1380 = 7E56 2
1390 = E021 9
1400 = 3602 5
1410 = 1E76 1
1420 =  D1E 9
1430 = 1112 4
1440 = 7D93 6
1450 = 3258 A
1460 = A79E 2
1470 = E021 5
1480 = 4A69 C
1490 = 1E76 0
1500 = 4A96 5
1510 = 1112 D
1520 =  E2C 3
1530 = 3258 C
1540 = ED0F 1
1550 = 32B5 D
1560 = E272 F
1570 = 42FA 9
1580 = C270 A
1590 =  354 7
1600 = 22DB 5

1610 = 2B9A 3
1620 = 36B6 B
1630 = E9C0 A
1640 = 8930 0
1650 = 3337 1
1660 = A495 1
1670 = 939D 6
1680 = 1375 2
1690 = EB7B E
1700 = 7588 9
1710 = 2970 E
1720 = CA42 4
1730 = B7E4 C
1740 = B391 C
1750 = 70E5 C
1760 =  607 E
1770 = B9F9 5
1780 = CC3F B
1790 = 2B9A 3
1800 = 2215 9
1810 = 7A16 2
1820 = ED0F 9
1830 = 469E 3
1840 = 568B 6
1850 =  326 1
1860 = 1506 7
1870 = ED0F D
1880 = 7A16 0
1890 = 1375 5
1900 = 8FD9 2
1910 = 310F 3
```

It's the latest – and the most exciting add-on for the BBC Micro

Actual size A4. The Z88 is less than an inch thick and weighs under 2lbs!

The Sinclair Z88 is the world's first truly portable, truly full-facility computer. And because it uses BBC Basic it is the ideal companion for the BBC Micro and Master.

Use it on the move!

Because it weighs less than a bag of sugar, it's an ideal travelling companion. Word-process your letters, memos or reports while on the move – then when you're back home or in the office transfer your files to your BBC Micro – it's done in seconds!

Solid-state storage

The Z88 doesn't need bulky disc drives. Memory is stored in solid-state interchangeable packs measuring 2½in square. Extra ram and eprom packs are available from suppliers such as Watford Electronics.

SPECIAL OFFER!

Exclusive to readers of *The Micro User* – the Z88 comes complete with a disc of games and utilities you can transfer direct from your BBC Micro with the FREE lead supplied.

The disc and lead can be bought separately for £22.70 from the address given on the coupon.

ONLY £249 plus VAT

The Micro User Z88/BBC Micro transfer
File saved on disc as MEMO
Load into word processor (Y/N)?
1 MINI OFFICE II
2 WORDWISE PLUS
3 WORDWISE
4 VIEW
5 INTERWORD
Press a number_

ORDER TODAY

What the Z88 offers:

- 32k of ram built in, easily expandable to 416k.
- New supertwist LCD screen for sharp, clear viewing.
- Built-in word processor, spreadsheet, database, calculator, diary, calendar, comms, real-time clock and alarm – all included in rom.
- BBC Basic with integrated Z80 in-line assembler.
- Runs on four AA batteries, or use a mains adaptor.
- Printer editor to drive a wide range of printers.
- Detailed 218-page manual.

ORDER FORM

Please send me a Z88 with FREE disc and BBC Micro/Master lead for **£286.35** (£249 + VAT).

☐ Cheque enclosed payable to Database Electronics

☐ Please debit my Access/Visa no:

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date__________

Signed__________

Name__________

Address__________

Allow 28 days for delivery Postcode__________

SEND TO: Database Electronics, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

Telephone orders: *0625 879920*

Orders by Prestel: *Key *89 then 614568383*

MicroLink/Telecom Gold: *72:MAG001*

MU11

B B+

Featuring

- Palace of Magic
- Bonecruncher
- Anarchy Zone
- Spellbinder
- Star Wars
- Saracoid
- Ransack
- Uridium
- Zarch

Going for Uridium

Hac Man reveals the secrets of the smoothest game on a BBC Micro

RECENTLY I received a letter from Angus Hughes who seems destined for great things. He is one of three university students who produced the BBC Micro version of the sideways scrolling shoot-'em-up – Uridium – on which Audiogenic's Psycastria was based. Angus' letter is crammed full of survival hints and snippets of information that I'm sure will be of interest to fans of the game.

There are two sorts of alien attack wave, stationary and follow-the-leader. Always attack the unmoving waves from behind and of the five aliens in a wave only four will fire. Mines will be launched only when there are fewer than five aliens remaining, and a maximum of three will be launched at any one time. In addition, no aliens will be launched while mines are active.

After you are prompted to *Land now*, no further waves of aliens appear but mines continue to be launched. The master runway is at the right-hand side of each dreadnought and can be identified by its leading arrows.

Your ship can fly left or right at four different speeds. At the three higher ones it can rotate on to its side to enable it to fly through small gaps. There are 14 completely different levels, each of which is about nine screens long, making a total of 126. Points scored for destroying alien ships rise every two levels and you lose a life if you don't complete or Quit the bonus screen before the countdown reaches zero.

Angus then goes on to ask *"Have you noticed...?"*: Your bullets do not pass through high barriers on the surface of the dreadnought. For rapid firing, a pair of bullets is fired when the button is depressed and another pair when it's released. The ship's bullets are closer together when the craft is on its side – you must fire accurately to shoot the tiny destructible features on the dreadnought's surface.

Both vertical and horizontal inertia acts on your ship – which moves an extra pixel vertically after the key has been released. The shadow is faithfully etched on the surface of the dreadnought and follows the movement of your ship. You can fly underneath the aliens and when you fly below the dreadnought you can see your ship through holes in the middle.

No operating system routines are used at all. The BBC Micro's whole memory – with the possible exception of about two bytes – is used, and all sound and printing routines are purpose-written. The screen display is a true multi-mode. The upper screen – scoreline – is in Mode 1 while the lower is in Mode 2. However, the lower part is hardware-scrolled independently of the scoreline.

Each level is possible and Angus has reached level 11 without cheating, scoring 100475.

Get the itch

Tommy Gilkhurst of Ardglass, Co. Down, Northern Ireland, has a suggestion that will be useful to players of *Spellbinder*. He says that adding Fleas to the end of any spell makes it more powerful.

Soft soap

Daniel Simms of Ackworth, West Yorks has sent in a short routine to allow extra lives on the disc version of **Bonecruncher**. Short is certainly the operative word – nobody could say it's been inefficiently written.

```
  10 REM Bonecruncher disc e
xtra lives cheat
  20 REM by Daniel Simms
  30 REM (C) The Micro User
  40 REM
  50 MODE 5:*BONE2
  60 ?&3527=n:REM where n is
 the no. of lives (1-255)
  70 *BONE2LD
```

Daniel adds that the line:

```
65 ?&353F=n
```

allows you to specify the number of soaps required to complete a level. Set *n* to 1 to complete each level after collecting and delivering just one bar of soap.

At a risk of being at odds with the overall theme of this column, I like Bonecruncher as difficult as it is – well, almost as difficult. However, on my travels through Bonecruncher Castle, I have occasionally come across a chamber from which I have emerged with the thought "That was easy".

Sometimes there seem to be many different ways to complete a screen, because so many skeletons are sitting around just waiting to be boiled up. Most of the chambers are so fiendishly designed that the only skeletons on offer are the 25 required to complete that level – many of which start off as monsters – but there are exceptions. Can any reader come up with a list of screens in which it is possible to collect more than five bars of soap?

Anarchy passwords

Kevin Dunnill of Billingham, Cleveland has sent me the complete set of passwords for Atlantis Software's budget priced shoot-'em-up **Anarchy Zone**. They are:

2	WATT	10	JILT	18	TRIO	26	SE15
3	EASY	11	SILK	19	FLEX	27	KELP
4	DUNE	12	CULT	20	LOBE	28	RENT
5	TACK	13	POLE	21	DAZE	29	MOLE
6	BILL	14	NERD	22	LOSS	30	DUEL
7	BURP	15	PALL	23	DUNG	31	BABE
8	BAIT	16	FEND	24	PACE	32	DUDE
9	WICK	17	CITY	25	WRAP	33	<AD>

Reaching high

I'm reluctant to publish high scores because they are so open to abuse, either by inventing one or by using a cheat facility to get a top score. Even screenshots or dumps can be faked easily.

But in the June 1988 column I did note a high score for **Zarch** – 71,469 by R. Johnson from Guildford. However, this undoubtedly impressive score has now been well and truly smashed by 14-year-old Anish Aggarual from Handsworth Wood, Birmingham, whose best score is 296,948 on attack wave 27. He asks the natural question: "Can anyone beat this?". Well, can anyone do better?

Anish has also sent in four pages of hints for Zarch – unfortunately I don't have enough space to print them this month, but I'll try to fit them in soon.

I've only played Zarch three times and predictably enough, on my first attempt I was compared unfavourably to a piece of lichen, rising to just above Pathetic on the high-score table at the end of my third attempt. I don't think I'll be challenging for Anish's crown just yet.

As the last word on Zarch for this month, Martin Angove of Caerphilly has just bought an Archimedes and would like to know what I recommend as a good first game. Need you ask?

Magic pokes

Here is a set of invulnerability pokes for the Master Compact and BBC Micro tape and disc versions of Superior's arcade adventure **Palace of Magic**. I wrote them when the game was first released, but filed them away, intending to revive them when the accompanying competition had closed. Instead, with so much good material coming all the time from you I forgot all about them.

So here they are at last; with the map in this issue you have all the keys to the palace.

```
   10 REM Palace of Magic in
vulnerability
   20 REM Tape version
   30 REM by Hac-Man 1988
   40 REM (C) The Micro User
   50
   60 FOR I%=0 TO 2 STEP 2:P
%=&900:[OPT I%
   70 JSR &A00 : LDA# &A9 :
STA &4661 : LDA# 0 : STA &46
62 : \ invulnerability
   90 JMP (&A3C)
  100 ]:NEXT:MODE 7:*FX 15,0
  110 PRINT"Please insert Pa
lace of Magic tape, hit a ke
y and press play...":A%=GET
  120 PROCload:CALL &900
  130 END
  140
  150 DEFPROCload
  160 !&A00=&208D27A9:!&A04=
&8D0AA902
  170 !&A08=&0EA90221:!&A0C=
&F42004A2
  180 !&A10=&A01FA2FF:!&A14=
&FFF7200A
  190 !&A18=&04A20DA9:!&A1C=
&4CFFF44C
  200 !&A20=&4D4F502E:!&A24=
&080D0D32
  210 !&A28=&98488A48:!&A2C=
&03CAAD48
  220 !&A30=&CA8DFE29:!&A34=
&68A86803
  230 !&A38=&602868AA:!&A3C=
&524D63A0
  240 ENDPROC
```

Palace of Magic invulnerability for BBC Micro tape

```
   10 REM Palace of Magic in
vulnerability
   20 REM BBC Micro disc ver
sion
   30 REM by Hac-Man 1988
   40 REM (C) The Micro User
   50
   60 FOR I%=0 TO 2 STEP 2:P
%=&900:[OPT I%
   70 LDA# 96 : STA &9B4 : J
SR &970
   80 LDA# &A9 : STA &4461 :
 LDA# 0 : STA &4462 : \ invu
lnerability
   90 JMP &63A0
  100 ]:NEXT:MODE 7:*FX 15,0
  110 PRINT"Please insert Pa
lace of Magic disc and  pres
s any key...";:A%=GET:*LOAD
POM2
  120 CALL &900
```

Palace of Magic invulnerability for BBC Micro disc

```
   10 REM Palace of Magic in
vulnerability
   20 REM Master Compact ver
sion
   30 REM by Hac-Man 1988
   40 REM (C) The Micro User
   50
   60 MODE 7:*FX 15,0
   70 PRINT"Please insert Pa
lace of Magic disc and  pres
s any key...";:A%=GET
   80 *MOUNT
   90 ?&C42D=&8D:*RUN POM2
  100 ?&192B=&36:!&1B66=&60A
A00A9:CALL &1900
  110 ?&4661=&A9:?&4662=0:CA
LL &63A0
```

Palace of Magic invulnerability for Master Compact

Bonus cheat

John McIver of Garforth, Leeds, has sent me details of a cheat mode built into Audiogenic's **Saracoid**. This fun shoot-'em-up was only released as a bonus title on the Power Pack II compilation. However, it is a game worth seeking out, especially for Galaforce fans.

John says that the cheat can be activated when

Turn to Page 88 ▶

◄ *From Page 87*

the title page – with the message *SARACOID by DEAN LESTER* – is being displayed on the screen. Press G then L in rapid succession. The micro will now come up with the message *CHEAT MODE, WHICH SCREEN*. Enter a number between – 1-30 – and press Return. You will start on that level with eight lives. Thank you John.

Incidentally, if the name Dean Lester sounds familiar, he is also known for Ziggy, also published by Audiogenic.

Feel the Force

Ben Porter of Walthamstow, London, has a tip that will be of passing interest to owners of the disc version of Domark's **Star Wars** who also have a disc drive with an independent power supply. It has the effect of making the game absurdly easy to complete. I don't own a copy of the game, so I haven't been able to check the accuracy of this tip, but here goes anyway.

Ben says you should load the game as normal, and turn off your disc drive as soon as it has finished loading. You will be transported into the Death Star automatically. Just press fire to destroy it. Apparently you can do this over and over again – ideal for those who want to save the universe with the minimum of effort.

More ransacking

In response to the August column in which I detailed the cheat facilities built into Peter Scott's **Ransack**, Stewart Roberts of Long Eaton, Nottingham, has sent in a routine that allows true infinite lives, as opposed to the mere 230 provided by the game's cheat mode. However, it only applies to the disc version of the game. Put the disc into the drive and type:

```
*LOAD RANSAC1
?2610=96
CALL 2348
```

When the Basic prompt reappears, enter:

```
?7415=234
?7416=234
?7429=234
?7430=234
?7431=234
CALL 7325
```

The rest of the game loads, and you now have infinite lives.

21st Software

PRESENTS A SELECTION OF HARDWARE, UTILITIES & SOFTWARE FOR THE BBC MICRO

(ELECTRON VERSIONS AVAILABLE)

M Denotes Master Compatibility
MAIL ORDER ONLY

NOW VISA AGENTS

MINI OFFICE II	Our Price
Cassette	12.95
5.25"	14.95
3"	17.95
Master Compact	18.95

NEW RELEASES	Cass	Disc	Compact
Yes Prime Minister	12.95	17.95	
Star Wars (M)	7.95	11.65	
Skirmish	8.25	10.65	13.65
Apocalypse		12.95	
Kourtyard	7.95	9.95	

SPECIAL OFFERS

Cassettes Only				Discs Only	
Dr. Soft 747	£4.95	Death Star	£5.95	Repton 2	£7.95
Erbert	£2.99	Overdrive	£3.95	Repton	£7.95
Pinball	£2.99	Chuckie Egg	£3.90		

NEW RELEASES	Cass	Disc	Cmpct
Superior's			
Barbarian	7.50	9.95	12.50
Quest	7.50	9.95	12.50
Play it Again Sam II	7.50	9.95	12.50
Spycat	7.50	9.95	12.50
Conqueror (Archimedes only)			20.45
Tynesofts			
Winter Olympiad 88	7.95	12.95	12.95
Indoor Sports	7.95	12.50	12.50
Saigon	7.95	12.50	12.50

ACCESS & VISA HOTLINE
Ask for Jacqui
0625 528885
24Hr Answer Service

SPECIAL! SPECIAL!
ANY 3 SUPERIOR BBC DISCS
That normally retail at £9.95 each
Only £27.00 (for 3)

	Cass	Disk	Compact
BEAU JOLLY			
Five Star Games III	8.45		
Computer Hits IV	8.45		
BUGBYTE			
Twin Kingdom Valley	2.95		
Tennis	2.95		
Savage Pond	2.95		
Cricket	2.95		
Dunjun Z 40T 8271DFS	2.95	6.95	
Plan B	2.99		
Hunky Dory	2.99		
Bug Byte Comp		£6.95	
C.D.S.			
Collosus Chess IV M	8.25	12.95	
Steve Davis	7.95	11.95	
Brian Clough M	12.95	15.95	
CLARES			
Fortwise Plus		15.95	
Replica III		13.50	
Beta Base Utilities		10.85	
DR. SOFT			
747 Flight Sim	6.95	8.95	
Phantom Combat	7.95	9.95	
Double Phantom		17.95	
DATABASE			
Instant Mini Office Roms		54.95	
DESIGN PEOPLE			
Tanks		11.65	
Sink/Bismark		9.65	
Battle of Britain	8.45	11.45	
Midway	11.65	11.65	

	Cass	Disk	Compact
DOMARK			
Trivial Pursuits	12.45	15.95	
Young Trix	13.45	16.95	
The Living Daylights	8.45	11.65	

DATABASE'S SPECIAL
RED ARROWS DISC
£4.95 ONLY

	Cass	Disk	Compact
ELITE			
Paperboy	8.45	13.65	
FIREBIRD			
Sentinel	8.45	12.95	
Cholo		15.95	
HEWSON			
Evening Star	7.95	10.95	
Uridium	7.95	12.95	
ASL/ICON SOFTWARE (Discs 40T only)			
Psycastria	6.75		
Int. Megasports/Genisis	7.45		
Thunderstruck II M	6.75	10.65	
Graham Gooch Cricket M	8.45	10.65	
Omega Orb M	6.75	10.65	
Sphere of Destiny M	6.75	10.65	
Ransack	7.95	9.95	
Ziggy	7.25	9.45	
Despatch Rider	7.25	9.45	
Impact	7.25		
INCENTIVE			
Moon Cresta	6.95	8.95	
KOSMOS SOFTWARE			
French Mistress A or B	7.95	8.95	

	Cass	Disk	Compact
German Master A or B	7.95	8.95	
Spanish Tutor A or B	7.95	8.95	
Answer Back Jun. or Sen.	8.95	9.95	
Answer Back Sport	8.95	9.95	
Identify Europe	6.95	9.95	
LCL			
Micro Maths (GCSE) M	21.50	21.50	21.50
Micro English (GCSE) M	21.50	21.50	21.50
Mega Maths ('A' Level) M	21.50	21.50	21.50
Micro French (GCSE) M	21.50	21.50	21.50
LARSOFT			
Rising of Salandra M	4.65		
Wychwood M	3.95		
Nine Dancers M	3.95		
Puppet Man M	3.95		
Hex	3.65		
LEISURE GENIUS			
Scrabble	11.65	13.65	
Monopoly	11.65	13.65	

SPECIAL OFFER
Incentives Graphic Adventure Creator
Cass. £5.95 Disc £8.95

	Cass	Disk	Compact
MIRRORSOFT			
Harrier Strike Force	8.95		
Spitfire 40	7.95	10.95	
ROBICO SOFTWARE			
Enthar 7		16.45	
Island of Xaan	8.95	10.95	
Rick Hanson	7.95	10.95	
Project Thesius	7.95	10.65	
Myorem	7.95	10.65	

	Cass	Disk	Compact
The Hunt	7.95	11.65	
SQUIRRELSOFT			
Supergolf	7.00		
T.V. Director	11.65	13.65	
ACORNSOFT AND SUPERIOR SOFTWARE			
Citadel	7.95	9.95	12.95
Speech	7.95	9.95	12.95
Thrust	6.95	10.65	
Strykers Run M	7.95	9.95	12.95
Gaia Force	7.95	9.95	12.95
Repton 3 M	7.95	9.95	12.95
Ravenskull M	7.95	9.95	12.95
Elite M	11.65	13.65	17.95
Revs + 4 Tracks M	11.65	13.65	18.65
Acornsoft Hits I or II M	7.95	9.95	12.95
Superior Collection Vol I M	7.95	9.95	12.95
Superior Collection Vol II M	7.95	9.95	12.95
Grand Prix Cons. Set M	8.45	10.65	12.95
Around the World 80 Screens	5.95	6.95	8.75
Codename Droid M	7.95	9.95	12.95
Crazee Rider M	7.95	9.95	12.95
Life of Repton M	5.95	6.95	8.65
Elixir M	7.95	9.95	12.50
Spellbinder M	7.95	9.95	12.50
Bonecruncher M	7.95	9.95	12.50
Palace of Majic M	7.95	9.95	12.95
Play It Again Sam	7.95	9.95	12.95
TYNESOFT			
Spy Vs Spy M	7.95	10.95	13.45
Phantom M	6.75	10.95	11.65
Oxbridge	6.75		
Goal	6.50	10.65	11.65
Futureshock M	6.50	10.65	11.65

	Cass	Disk	Compact
Jet Set Willy II	6.50	10.65	11.65
The Big K.O.	6.50	10.65	11.65
Commonwealth Games	6.50	10.65	11.65
Winter Olympics	6.95	10.65	
Micro Value (4 games)	3.99		
Micro Value Gold (contains Ian Botham + Jest Set Willy)	3.99		
UTILITIES & ROMS Etc.			

SPECIAL DISCS
Bugbyte/Lothlorien
World War 1 Disc–£4.95
Bugbyte Compilation II–£4.95
Both Together–£8.45

REPLAY (Please state op. system)
ONLY £29.00
MASTER REPLAY (self contained)
ONLY £38.95

ARCHIMEDES SOFTWARE	
CLARES	
Toolkit	£37.95
Artisan	£37.95
Alpha Base	£45.95
Image Writer	£26.95
SUPERIOR SOFTWARE	
Zarch	£17.45

NEW SUPERIOR'S PIPELINE
Cass: **£7.50** Disc: **£9.95** Compact **£12.50**
PLAY IT AGAIN SAM III
Cass: **£7.50** Disc: **£9.95** Compact **£12.50**

All new Superior Titles available on release date:
Cassette £7.50, disc £9.95 Compact £12.50

21st Software Limited. 15 Bridgefield Avenue, Wilmslow. Cheshire, SK9 2JS. Tel: (0625 528885)
ALL PRICES ARE INCLUSIVE OF VAT AND CARRIAGE
OVERSEAS ORDERS PLEASE ADD £1.00 PER ITEM. EDUCATIONAL & GOV'T ORDERS WELCOME
We guarantee all titles are originals. We offer a quick and reliable service.

NEW RELEASES	Cass	Disc	3.5"
Superior's Repton Thru Time	5.95	6.95	8.65
Mandarin's Icarus	7.50	9.95	

Please send me: Cas ☐ Disc ☐ 40T ☐ 80T ☐
Compact Disc ☐ ☐ Archimedes
1. ______ £ ______
2. ______ £ ______
3. ______ £ ______
4. ______ £ ______
TOTAL £ ______

Please ensure all Visa & Access orders quote the cardholders name and registered address
Please make cheques payable to:
21st Software Ltd
Access & Visa ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
Send Orders to:
21st SOFTWARE LTD. Dept MU
15 Bridgefield Avenue,
Wilmslow SK9 2JS
Tel: Wilmslow (0625) 528885

Name ______
Address ______
Post Code ______
Tel. No ______

Living happily with the mouse

Mike Cook shows how to move control away from your micro keyboard

THE Archimedes has a very important alternative input device – the mouse. And you can you incorporate its use into your own programs very easily. One way is to let the mouse control your software by using control buttons – a command appears in a rectangle and to activate it you move the mouse pointer over to the rectangle and click.

The rectangle then inverts to indicate what you have selected and when you release the button the appropriate command is carried out.

This may seem quite a complex sequence to code, but it is quite simple if you tackle it the right way.

The listing shows how this can be done. It will draw a circle, and selecting any of the four control rectangles will move its position. It may not be the most exciting routine in the world, but it illustrates the use of the mouse in a Basic program.

The breakdown shows exactly how the program works and you should have no problem following it. So there you have it: You can now use mouse controls in your own software. If you write any interesting routines we'd love to see them.

PROGRAM BREAKDOWN

60 to 100	Draw the rectangles and print the text inside them.
140 to 170	Constitute the main loop of the program: In each loop a procedure PROC_MOUSE is called to see if any control is being called for.
210	Reads the state of the mouse buttons and returns if nothing is being pressed. If any is being pressed we test to see if it is in any of our defined functions by a routine which returns a logic variable TRUE or FALSE, depending on whether the mouse is pointing at a control. This function is at the heart of the program and can easily be incorporated into your own routines. The function is passed the size of the rectangle using exactly the same numbers used to draw it.
370 to 390	Test to see if it is within the bounds of the rectangle. If it isn't FALSE is returned otherwise the rectangle is inverted – line 410 – and the program waits until the mouse button has been released. Then the rectangle is inverted again, leaving it in its original state and a TRUE value is returned from the function.
250 to 280	Test each control rectangle.
290 to 320	Perform the appropriate action. The testing and conditional actions have been separated for simplicity but they could easily be combined.

```
 10 REM > MOUSE
 20 *POINTER
 30 MODE1
 40 VDU 23,1,0,0,0,0,0,0,0,0
 50 MOUSE ON
 60 PRINTTAB(4,22);"LEFT   RIGHT    UP     DOWN"
 70 RECTANGLE 114,274,158,64
 80 RECTANGLE 338,274,188,64
 90 RECTANGLE 626,274,96,64
100 RECTANGLE 850,274,158,64
110 PRINTTAB(0,27);"Mouse Handling Example By Mike Cook"
120 XR%=640
130 YR%=750
140 REPEAT
150 PROC_RMOUSE
160 CIRCLE XR%,YR%,80
170 UNTIL FALSE
180 END
190 DEF PROC_RMOUSE
200 LOCAL MX%,MY%,B%
210 MOUSE MX%,MY%,B%
220 REM EXIT IF MOUSE NOT DOWN
230 IF B%=0 THEN ENDPROC
240 REM SEE IF POINTER IS IN A RECTANGLE
250 GUP=FN_MBOUND(626,274,96,64)
260 GDOWN=FN_MBOUND(850,274,158,64)
270 GLEFT=FN_MBOUND(114,274,158,64)
280 GRIGHT=FN_MBOUND(338,274,188,64)
290 IF GRIGHT THEN XR%=XR%+4
300 IF GLEFT THEN XR%=XR%-4
310 IF GUP THEN YR%=YR%+4
320 IF GDOWN THEN YR%=YR%-4
330 ENDPROC
340 DEF FN_MBOUND(RX,RY,RW,RH)
350 LOCAL XT,YT
360 XT=FALSE
370 IF MX%>RX AND MX%<(RX+RW) THEN XT=TRUE
380 IF MY%>RY AND MY%<(RY+RH) THEN YT=TRUE
390 IF (XT=FALSE) OR (YT=FALSE) THEN =FALSE
400 MOVE RX,RY
410 PLOT &62,RW,RH
420 PROC_MUP
430 MOVE RX,RY
440 PLOT &62,RW,RH
450 =TRUE
460 DEF PROC_MUP
470 REM WAIT UNTIL MOUSE BUTTON IS RELESED
480 LOCAL TX%,TY%,TB%
490 MOUSE TX%,TY%,TB%
500 WHILE TB%<>0
510 MOUSE TX%,TY%,TB%
520 ENDWHILE
530 ENDPROC
```

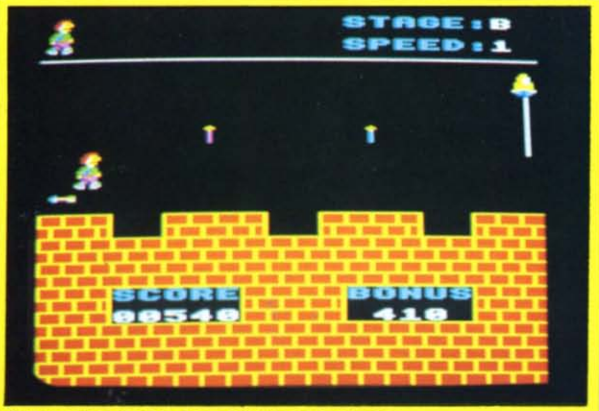
Key to success

Pete Davidson interviews the creator of many of the best games which have appeared in The Micro User

GORDON Key originally became interested in micros purely as a hobby while working for the AA. His fascination started at the time when the Sinclair ZX81 was just becoming popular. "I nearly bought one, but fortunately couldn't afford it at the time" jokes Gordon who later went on to buy a Commodore Vic 20 and then a Jupiter Ace. Neither of these machines particularly impressed him and in 1982 he splashed out on a BBC B which really started to accelerate his interest.

"I did produce a couple of programs for the Vic 20 but it was a terrible machine to program. The BBC Micro was so friendly that I found myself writing more and more.

"About five years ago I saw an advertisement in *The Micro User* offering to evaluate programs and help programmers with any problems. I sent them a fairly simple game entitled Quadline based on the Connect 4 idea. The Editor contacted me and a few months later it was printed as a listing in the magazine.



Quazimodo's Quest: One of Gordon's favourites

Although just programming for pleasure, Gordon was delighted that the program was going to be put to good use. Following the interest from *The Micro User* he subsequently sent further programs in Basic, including Harbour Command, Tipaka, Pendragon and several others, all of which appeared in this magazine.

Most of his ideas at that time came from existing games which he modified. But as he progressed and his programming skills developed he started to produce better and better games.

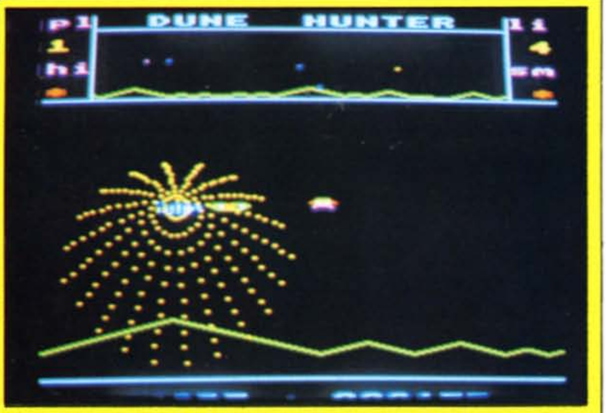
"A couple of years ago Database published two of my games on its discs. One was called Christmas Lights which appeared on the Christmas disc and the other – one of my favourites – was Quazimodo's Quest which featured a hunchback scaling the ramparts of a castle".

Gordon also became more adventurous and started using more and more machine code. He wanted to produce magazine games that were as good as commercial ones. One of his creations which received great acclaim was Dino. It also brought in the first complaint he had received.

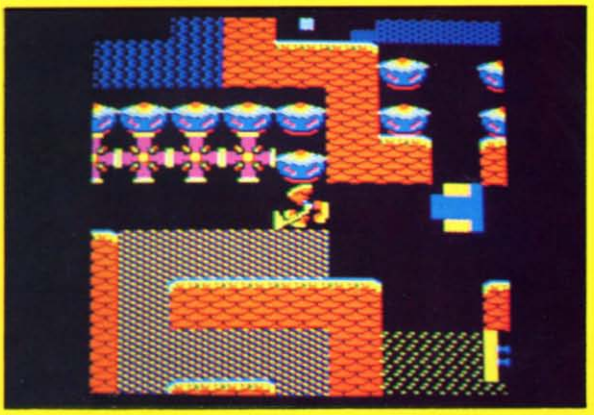
"Someone actually wrote to the magazine protesting that one of the game characters – named Jenny Greenteeth – was a relative. I hope not for his sake, as Jenny Greenteeth is actually a witch from an old wive's tale invented to frighten children from going too near rivers".

Next came Hunkie Egg, then McBrolly followed closely by his first horizontally scrolling game, Dune Hunter, which he admits himself was really very good and exceptional for a magazine game.

"I wanted to produce something that would astound anyone who typed it in. It included four-way scrolling, multi-levels, commercial quality graphics and music. It was at this stage that I



Dune Hunter: Exceptional for a magazine game



Clogger: Action from next month's free disc came up with the ideas for Clogger".

Clogger's central character is so unusual that it is hard to imagine how anyone could dream it up. It's a three-legged being with no head, a shovel and great big boots.

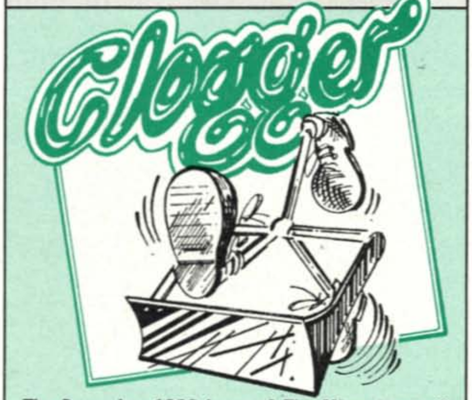
Gordon says that as a youngster he was fascinated by large shiny army-style boots, and would draw all kinds of creatures wearing them. The natural choice of character for Clogger was a bulldozer, but Gordon adapted it to a bootdozer as he thought it was more amusing.

There were a lot of technical problems: The scrolling routine had to be extremely fast as so many of the objects can be pushed around. Memory started to get very tight, and some ingenious techniques had to be used to allow the pictures to be created.

"To do everything I wanted it was going to be an extremely long magazine listing. Comments from friends led me to believe that it would justify a full commercial launch so a few months later I showed it to Mark and Steve Botterill at Impact. They thought it was fabulous and said they would be delighted to publish it. Its launch is at the November Electron and BBC Micro user show".

Gordon has now set up in business restoring old buses but he has also bought an Archimedes and is learning ARM assembly language. He also has ideas for further BBC Micro programs and intends to convert Clogger to the Electron. So watch out for more from this new master programmer of Acorn machines.

FREE NEXT MONTH



The December 1988 issue of *The Micro User* will feature a free cover disc giving exclusive previews of Impact Software's latest releases.

There's a demo version of Clogger by Gordon Key complete with three full screens and, in addition, three sets of pokes from the Cheat It Again, Joe discs so that you can make your games easier to play.

So make sure you get your copy of *The Micro User* for the very best in BBC Micro entertainment and games.

THE MICRO USER MAIL ORDER OFFERS THE MICRO USER MAIL ORDER OFFERS

Get THE MICRO USER FREE each month

SAVE UP TO £31!

when you subscribe to our monthly tape or disc

Incredible, but true, for a limited period we are now giving away *The Micro User* for a whole year – when you take out a tape or disc subscription. That's worth £18! And you will be eligible to save up to a further £13 on the special subscription offers on Page 135.

Each of the monthly tapes and discs is packed with all the fun-filled games and power-packed utilities from the pages of *The Micro User,* plus occasional extras, such as weather maps and Archimedes programs, which you won't find in the magazine.

Remember, this offer is for a limited period only, so save the wear and tear on your fingers, and ensure you get programs that work the first time, by taking us up on this special offer, *today!*

Note: If you don't wish to subscribe to the magazine, you can still take out a tape or disc subscription at a saving of £10! Or, if you are already a subscriber, you may renew your subscription early to take advantage of this exceptional offer.

Tape subscription	
Usual price	£35
Special price	*£25*
YOU SAVE	£10

Tape + magazine subscription	
Usual price	£53
Special price	*£35*
YOU SAVE	£18

Disc subscription	
Usual price	£50
Special price	*£40*
YOU SAVE	£10

Disc + magazine subscription	
Usual price	£68
Special price	*£50*
YOU SAVE	£18

To place your order, please turn to the form on Page 135

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: 01 950 8989
Shop Hours: 9am to 6pm (Mon.-Sat.) Thursdays 9am to 8pm
All prices exclusive of VAT; subject to change without notice & available on request.
Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

Acorn
The choice of Experience

The choice before and after the experience

Archimedes micro

System	Basic	Mono	Colour
305	£699	£759	£909
310	£829	£875	£1025
310M	£879	£925	£1099
440	£2399	£2449	£2595

(Securicor carr. £10 on Micros)

Archimedes FREE PRINTER OFFER

FREE, £160 worth of Hardware

With every Archimedes Micro purchased from us this month, we are giving away absolutely FREE a Panasonic KX-P1081 Dot Matrix PRINTER and an Archimedes PRINTER LEAD worth £160. If you already own a printer, then simply phone in for alternatives. (P.S. This offer does not apply with 0% finance scheme mentioned in column).

● 0.5 Mb RAM for 305	£149
● Podule Backplane	£37
● ROM Podule (Computer Concepts)	£48
● ROM Podule (C C) with Battery Backup	£59
● ROM Podule (takes five 8 bit ROMs, of 16, 32, 64 or 128K)	£56
● Archimedes Ref Manual	£29
● 2nd 800K floppy disc drive (for 305, 310 & 410)	£118
● Econet Network Board	£40
● Backplane for 2 podules, with fan (305, 310)	£39
● I/O Podule (with User port, Analogue port & 1MHz bus)	£85
● MIDI add-on to I/O Podule	£38
● MIDI Expansion Card	£66
● Real time Video Digitiser (Watford)	£249
● Sound Sampler (Armadillo)	£105
● 20 Mb Hard Disc & Controller Card	£469

WORDPROCESSORS

Wordwise +	£18	Pipedream	£89
Image Writer	£25	View	£49
Interword ROM	£35	Viewspell	£32
1st Word Plus	£79	ViewIndex	£12
Archie Spell Master	£49		

DATABASES

AlphaBase	£39	Viewstore	£49
System's Delta Plus			£60

SPREADSHEETS

Intersheet ROM	£35	Viewsheet	£49

BUSINESS GRAPHICS

GammaPlot	£30	Interchart ROM	£22

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet, Time Management & Business Graphics £95

PC EMULATION Pack

(for 310, 410 & 440), including MSDOS 3.21 £79

GRAPHICS, ART & DESIGN

Interchart	£25	Gamma Plot	£30
Artisan	£31	Gamma Plus	£60
Support Disc	£17	**Autosketch**	£69
Toolkit (Beebug)	£32	Toolkit (Clares)	£31
Arc Termulator	£59	Zarch	£16

LANGUAGES

ANSI 'C'; ISO-PASCAL; FORTRAN 77;	£95 each
Cambridge LISP; PROLOG X	£181 each
Archimedes Assembler	£189
TWIN EDITOR	£27

0% (APR) FINANCE

*For a limited period, Watford Electronics are able to offer the Archimedes range of microcomputers at **0% (APR)** finance. Credit facility available subject to status. Please inquire for further details.*
(Watford Electronics are Licenced Credit Brokers)

Archimedes to BBC SERIAL LINK

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers. Using this package it is possible to transfer any data from the BBC to Archimedes at upto 19200 baud.
By far the easiest way to transfer data to your new computer.

Only £25

Archimedes 5¼"/3½" Disc drive Interface

With this interface it is possible to connect almost any 5¼"/3½" disc drive with its own power supply to the Archimedes. NO SOLDERING is involved. Supplied complete with necessary lead.

Only £19

Note: This is not simply a lead. Attempting to connect an external disc drive by direct connection may result in damage to your Micro.

New

By Popular demand we are now supplying refurbished and fully guaranteed BBC Micro Model B with Disc Filing System

(Please telephone for price & availability)

NEW

Archimedes On-site Maintenance now available

(Please write in for further details)

The 80186 Co-Processor

This package consists of the Master 512 board, Watford Co-Pro Adaptor, 1770 Disc Upgrade and Acorn ADFS. This is a complete package, with its own power supply, ready to interface with your BBC Micro. The Master 512 board using the 80186 16 bit Processor at 10MHz and running Digital Research DOS Plus, gives a high degree of IBM compatibility at an extremely reasonable price. Included in the 512k package is a mouse and the amazing Digital Research GEM suite of software; GEM Paint, GEM draw and GEM desktop giving a complete Mouse Icons environment (All other GEM packages will work on the 512k). Famous packages that will work with the 512k board include Wordstar, Dbase II, Lotus 123 and many others. The only requirement to upgrade any BBC Model B to this system is you must have twin 80 track disc drives.

New low price **£175**

CREDIT TERMS now available.
Please telephone or write in for further information.

BBC MASTER

MASTER 128K Micro incl. Acorn's: View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus £125 worth of FREE OFFER (see below) **£379**

SPECIAL OFFER

FREE . . . £105 worth of Hardware & Software

*Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control and **Watford's** 3½", double sided 1 Megabyte (unformated) single disc drive complete with cables, ready to connect to the micro – with every BBC Master purchased from us this month.*

BBC MASTER with Turbo Board + above SPECIAL OFFER £513

512K Processor Add on Board "inc. Mouse and GEM package" ***£75***

BBC MASTER plus 512K 80186 Co-processor Board (incl. Mouse and GEM package) plus the above £105 worth of SPECIAL OFFER £449

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£116
Econet Module for the Master	£40
Twin ROM Cartridge for Master	£7.50
Quad ROM Cartridge for Master	£11
Universal Processor Adaptor	£75
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref. Manual	(No VAT) £19
64K Upgrade Kit for B+	£32
Acorn 1770 DFS Kit complete	£49
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
ARIES' Professional IEEE Interface	£238
Acorn IEEE Interface Complete	£265
Morley Teletext Adaptor with ATS Rom	£99
Filestore E01 £699 Filestore E20	£599
Filestore E01 & E20 together	£999

BBC MASTER COMPACT

System 1	Standard Package	£299
System 1A	System 1 + TV Modulator	£315
System 2	System 1 + Green Hires Monitor	£345
System 3	System 1 + Medium Res Colour Monitor	£469
RS232 Kit for BBC Compact		£25
Additional 3½" Drive for BBC Compact		£90

(Securicor carriage £7)

65C102 2nd PROCESSOR

(65C102 replaces the original Acorn 6502 2nd Processor)

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B. This is a complete package, with its own power supply, ready to interface with your BBC Micro.

£159

Z88 Sinclair's Portable Micro

The worlds first, truly portable Micro. It is A4 size, only an inch thick and weighs under 2lbs. Ideal for use when travelling or as a personal organiser.

Only: £239

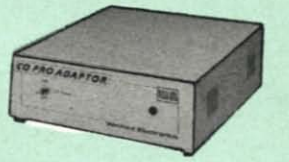
FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

Mains Adaptor	£8.65
32K RAM Pack or 32K EPROM Pack	£17.35
128K RAM Pack or 128K EPROM Pack	£43.40
512K RAM Pack	£169
Z88 Spellmaster for Pipedream	£51
Z88 to BBC Link	£21.70
Z88 to PC Link II	£30
Z88 EPROM ERASER	£34.75
Serial Printer Cable	£8.65
Parallel Printer Cable	£24.00
Z88 Modem	£145
Z88 Soft Carrying Case	£8.50
Sinclair Z88 Computing Book	£9.95
AA Nicad Rechargeable Battery	£1.50
Battery Charger, Compact & Fast (3 Hours)	£6

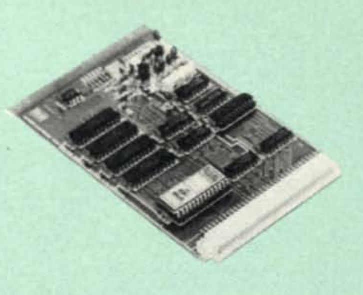
CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.
Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.
With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.
To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.
Master owners may use Co-Pro to add a second Co-processor externally.
Watford, brings power to your BBC at only:

£35 (carr £5)

Archimedes Real-Time Digitiser



Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

Once captured, Video images can be stretched, squahsed, rotated, stored on disk, printed, or used by applications software.

Applications include desktop publishing, graphics, animation, image analysis and recognition, medical imaging, automatic inspection and measurement, databases, interactive video, remote transmission of pictures via a modem, movement detection ... or anything else you can think of!

SPECIFICATION

SOFTWARE

All the driver software for the digitiser is contained in a ROM on the podule. Facilities provided include:

- Grabbing of images to the screen or dumping to memory.
- Continuous grabbing and display for previewing or camera alignment.
- 'Hot key' grabbing – pressing a (configurable) key combination grabs and displays an image on the screen while another program (e.g. paint software such as Artisan) is running.
- Scaling (zoom/shrink) any section of an image to any size in X and Y directions, with optional X/Y flip, window clip and logical (AND/OR/XOR) plotting.
- Rotation and scaling to any angle and size, rotating about any point, with optional window clip, and logical (AND/OR/XOR) plotting.
- Very versatile matrix printer screendump facility for Epson FX, LQ and EX compatible printers – pictures can be printed to ANY size (including multiple sheets) at any orientation, using any available printer density and one of six internal sets of dot patterns, or with user definable patterns (pattern editor supplied). The screen-dump can also be used for general purpose graphics screen printing.
- Pixel value lookup tables: pixel values can be passed through a user defined lookup table to allow contrast enhancement, thresholding pseudo-colouring etc.
- Smoothing and noise spot removal to enhance image quality.
- Creation of sprites from all or part of a digitised image.
- Saving and loading of digitised images in compressed format.
- Combination of pictures by adding, avaraging, subtracting, multiplication etc.
- Much faster versions of the Arthur *ScreenLoad and *ScreenSave commands.

Software facilities are accessed via operating system star (*) commands and SWI calls. High resolution screen modes using MultiSync type monitors are supported.

UTILITY DISK

A disk is included, containing sample pictures, examples and utility programs including the following:

- Colour image grabbing using colour filters with monochrome or colour cameras, including colour balance adjustment and scaling facilities.
- Pattern editor for 2 colour display modes and printer screendumps.
- 512 line interlaced display for non MultiSync monitors.
- Thresholding to create two colour images.
- Capture and replay of animated sequences.
- Several example programs illustrating the use of digitiser software.

RESOLUTION

Images are digitised to 512 (h) x 256 (v) pixels, and then scaled to fit the Archimedes' screen. It is possible to digitise to 512 x 512 pixels if the picture is stationary for about 0.1 second. 512 x 512 images can either be displayed on a MultiSync monitor, or on a normal monitor using interlacing.

Pictures are digitised to 64 levels of grey (6 bits). Note, however, that it is only possible to display all 64 levels on a monochrome monitor, or a colour monitor which has a composite (CVBS) input. For this reason, the Philips CM8533 monitor is recommended instead of the standard Archimedes monitor. It is also possible to connect both a colour and a monochrome monitor at the same time.

Any 2,16 or 256 colour graphics mode can be used to display digitised pictures. In two colour modes, grey levels are represented using dot patterns, which may be redefined if required (a pattern editor is supplied).

Cont.

SPEED

Video fields are captured in real time (1/50th sec.), and then transferred to Archimedes' memory or the screen. The grab/display rate is dependant on the screen mode and picture size, up to 25 fields per second for quarter screen images, or 12.5 per second for fullscreen (Mode 9).

HARDWARE

The digitiser is a single width podule, with a BNC socket on the rear panel for the video input, which may optionally be terminated via a link. There is 128K of on-board memory to store the digitised image, and a 32K ROM on the podule contains all the driver software.

Automatic video level control and black level clamping circuitry is used to ensure that the optimum contrast is obtained from a variety of video sources. A filter is included to avoid patterning effects when using colour sources.

Price £249

Watford Electronics are
Appointed & Authorised
DEALERS / REPAIR CENTRE
for Acorn Computers Ltd
Microvitec Monitors
Panasonic Printers

NEW

BBC PCB DESIGNER

At last! A PCB design package for the BBC Micro that eclipses some industry CAD software. Hard to believe, isn't it? Just look at some of the impressive package specification:

- Library Component Designer
- Component Library (over 200 parts)
- Component List Editor
- NetList Editor
- PCB Board Designer
- Plotter Driver
- Dot Matrix Printer Driver

This integrated suite of programs is packed full of sophisticated PCB related features making the design of a circuit board a dream instead of a nightmare.

Input for the design may be manual or Auto mode.

Some of the PCB Designer's features are:

- Over 120 library pad sizes/shapes
- Four colour adjustable palette
- Zoom range 2:1 to 1:4
- Highlighting of specific tracks
- Normal and surface mounted components
- Rapid screen review
- Menu driven
- Variable gridlock
- Switchable measurement grid
- Pre-select pan/scroll facility
- Large 24" x 24" Board size
- Copy route facility
- Connectivity held at all times
- Ratsnesting of part connections
- Auto-plaement of text references
- Text linked to parts
- Automatic placement of vias
- Printer and plotter outputs provided
- Comprehensive manual

TYPES OF PLOT OUTPUT

Top and bottom track artworks, top and bottom silkscreens, solder resist mask, drilling detail drawing and check plot. All these may be with pad holes on/off, scale of 2:1 or 1:1, board edge on/off, 90 degrees rotation, mirror image, width of pen, x & y offsets and batch plots to disc.

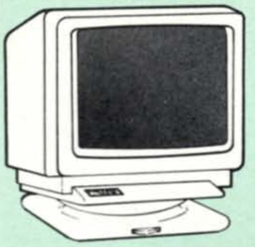
The above is only a taste of the superb features of this software, surely capturing previously unknown performance from the BBC Master computer. BBC B owners will need to fit at least one block of sideways RAM, Shadow screen memory and a disc drive. A trackerball or a mouse is also required.

Introductory Offer: £99

(Please write in for further technical details)

Continued →

MONITORS & SWIVEL BASES



All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14″

● 1431 – Standard resolution as used on the BBC television computer programme	£175
● 1451 – Medium resolution, suitable for word processing in mode 0	£219
● 1441 – High res, exceeds the capabilities of the BBC micro	£359
● 1431AP RGB + PAL and AUDIO	£199
● 1451AP RGB + PAL and AUDIO	£255
● **2030 CS 20″ Med Res**	**£380**
● **2040 CS 20″ Hi Res**	**£675**
● Dust Cover for Microvitecs	£5.50
● **Touchtec 501 Touch Screen**	**£239**

TAXAN 12″ & 14″

● **TAXAN Super Vision 2 Type 620** Hi-res RGB Colour monitor. Ideal for Wordprocessing	£263
● **TAXAN Super 3, Type 625** Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue	£313
● **TAXAN 14″ Multisync 770 Plus** – An autoscanning Ultra high res, colour monitor. Ideal for Archimedes, IBM & Compatibles	£479

● **NEC JC-1401P3EE 14″** Multisync Ultra Hi-res Intelligent Colour monitor. Auto scans frequencies between 15KHz to 35KHz. Text switch provides 7 colours for Database & wordprocessor.	£475

PHILLIPS

● BM7502 12″ Hi-res Green Monitor	£65
● CM8833 14″ Med. Res Colour Monitor	£219
● CM8852 14″ Med/High Res Colour	£249
● CM8873 14″ High Res Colour Monitor	£475

STAR BUY

- **PHILLIPS 14″** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £195

Dust Cover for Phillips Monitors	£6

NEW

SPECIAL OFFER
AMBER MONITOR

BT MERLIN/Acorn 12″ Hi resolution Amber monitor. Ideal for wordprocessing. Consealed front panel mounted controls. Illuminated mains on/off rocker switch. Supplied complete with BBC Cable.

Only £49
(Offer valid while stocks last)

N.B. carriage on Monitors **£7** (securicor)

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

By placing your monitor on one of our professional swivel bases (see monitors drawing on the left), you gain the freedom to adjust the monitor viewing angle to suit your needs and thus alleviate eye strain and reduce back stress. The front mounted adjustable control dial makes adjusting the monitor viewing angle very simple.

for 12″ Monitors **£7** (carr. £2.50)
for 14″ Monitors **£10** (carr. £2.50)

Anti-Glare VDU Screen

These extremely effective, easy to install, 12″ & 14″ VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. Hundreds of these screens are in daily use in various branches of one of the leading High Street banks.

£12

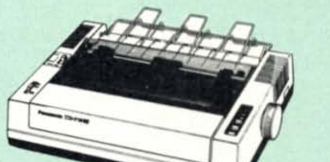
TAXAN KP-815 PRINTER

80 column, Bi-directional, 160 CPS, (NLQ 24cps); Friction & tractor feed + paper roll holder as standard; Epson FX compatible.

Offer Price £155

Taxan KP915 132 Column Printerr (carr £7)	£275
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

Panasonic KX-P1081



Attractively finished in BBC beige. Bi-directional, logic seeking. Has IBM and Epson RX compatible command calls. Speed: 120CPS draft mode, 24 CPS NLQ mode. Character width range from 5 cpi to 17 cpi. Upto 40 downloadable characters. Functions include, Proportional spacing, Justification, centering and left & right ranging.
(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£145** (carr. £6)

Optional RS232 Interface:	£39

Panasonic KX-P3131 Daisy-Wheel Printer

Low-cost, high performance; Bi-directional, Logic seeking, Proportional spacing, 10, 12 & 15 CPI, Speed 17CPS. 6K Buffer.

Only **£255** (carr. £7)

Tractor Feed	£90
Daisy Wheel (various)	£12
Ribbons: Standard **£4.50**; Long Life **£7**	
Extra 32K Printer Buffer (internally fitted)	£13

RS-232 GENDER CHANGERS

Male to Female	£6.95
Female to Male	£6.95
Male to Female	£6.95

Panasonic KX-P4450 LASER PRINTER

Latest technology at affordable price. Prints 11 pages a minute, Two A4 size paper bins, Serial & Parallel ports, 512K Buffer – expandable to 1.5Meg, 15 Character LCD Display, Diablo 630, Epson FX-286, IBM Proprinter, HP Laserjet emulations, 5K pages per month duty cycle.

ONLY £1,649

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

Price: £269

FREE Price includes a Free BBC Cable.

Cut Sheet Feeder	£65
Additional Font Cartridge	£25
NEC P2200 Pinwriter Ribbon	£6

NEC PINWRITER P6/P7 Plus

The Ultimate matrix Printer for Business.

Some of the features are:
- Print Speed, 265cps in Draft and 90cps in letter quality.
- Inbuilt Tractor & Friction feed.
- A paper park & low tear of facility.
- 20 inbuilt FONTS as standard.
- A Font cartridge facility.
- 8K byte Printer Buffer as standard.
- 24 Pin Printhead
- Colour Option available

P6 Plus 80 columns	£439
P7 Plus 136 columns	£545
Cut Sheet Feeder	£125
Colour Option	£74
Serial Interface	£73

EPSON PRINTERS

EX800	£415	LQ850	£469
EX1000	£569	LQ1050	£599
FX850	£315	LQ2550	£899
FX1000	£425	LX800	£179
GQ3500 Laser	£1249	SQ2500	£975
LQ500	£285		
Star LC10	**£192**	**LC10 Colour**	**£239**

PLOTTERS

Hitachi 672 Colour Plotter	£475
Plotmate Plotter A4S	£379
Plotmate Plotter A3M	£549

CUT SHEET FEEDERS for

EX800 **£149**; EX1000/LQ2550 **£210**; FX800 **£149**; FX1000 **£179**; LQ/LX800 **£139**; LQ500 **£75**; LQ850 **£135**; LQ1050 **£175**.

TRACTOR FEED for

EX800/1000 **£85**; LQ800 **£44**; LQ850 **£69**; LQ1050 **£85**; LQ2500 **£195**

ACCESSORIES

● EX800/1000 Colour Option	£55
● EX800/1000 Colour Ribbon	£18
● LQ2500 Colour Option	£65

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

Universal Printer Sharers/Changers

Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.
(Ideal for School environments.)

Connects	Serial	Centronics
2 to 1	£22	£23
3 to 1	£30	£32
5 to 1	£40	£42

(Cables extra at £6 each. Please specify type required when ordering)

INTEGREX COLOUR JET PRINTER

Colour Jet 132 Printer	£515
Paper Roll	£6
Screen Dump Software	£10
Colour Cartridge	£14
Black Cartridge	£8
100 A4 OHP transparencies	£55
8K Serial Interface Optional	£99

Professional Printer Stand

This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

***80 Column version £23** (carr. £2.50)*
***132 Column version £26** (carr. £2.50)*

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 1 meter	£7
IBM Parallel Lead 1 meter	£7
Double Ended 36 way Centronic Lead	£9
RS232 Leads (Various)	P.O.A.

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£9.95
Brother HR15/20	£3.00	£5.00
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	£4.95
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£4.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

● *1,000 Sheets 9½" × 11" Fanfold Paper*	***£7***
● *2,000 Sheets 9½" × 11" Fanfold Paper*	***£12***
● *1000 Sheets 9½" x 11" NCR 2 Part Fanfold*	***£19***
● *1,000 Sheets 15" × 11" Fanfold Paper*	***£9***
● *1000 Sheets true A4 Fanfold Paper*	***£11***
● *2000 Sheets true A4 Fanfold Paper*	***£19***
● *Teleprinter Roll (Econo paper)*	***£4***

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

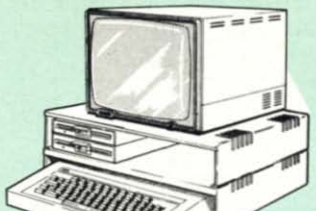
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	***£5.00***
1,000 90 × 36mm (Twin Row)	***£4.90***
1,000 90 × 49mm (Twin Row)	***£7.50***
1,000 102 × 36mm (Twin Row)	***£6.25***

Carriage on 1,000 Labels £1.00

PLINTHS FOR BBC MICRO, MASTER & PRINTERS

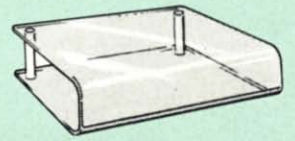


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of coolingslots it has elegant cutouts on the sides. This allows access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	**£12** (carr. £2)
Double BBc Plinth	**£20** (carr. £3)
Printer Plinth	**£12** (carr. £2)
Single Master Plinth	**£13** (carr £2)
Double Master Plinth	**£24** (carr £3)

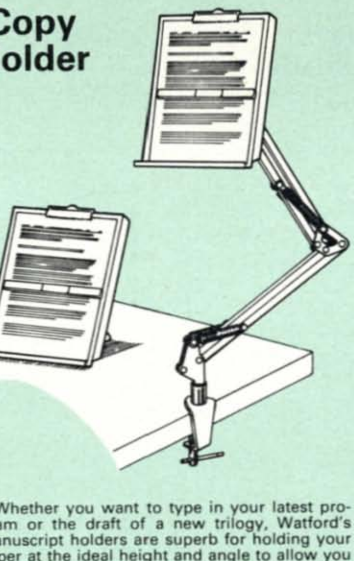
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

Only: £16 (carr. £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

MEGABUFFER 256

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- ● Low Cost, High performance.
- ● Improves efficiency by making more efficient use of computer and printer.
- ● Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- ● Total compatibility with all software.
- ● Cheaper phone bills when using your Modems.
- ● Ideal for those doing large graphics screen dumps that are slow to print.
- ● Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- ● Data Dump facility is included.
- ● Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £149 (carr £2)

OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: **£119**

BBC Screen Dump	£10
Colour Ribbon	£6
Black Ribbon	£6

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

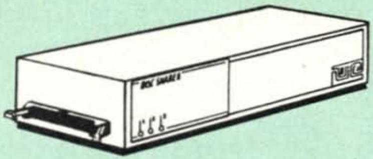
£5.95 (No VAT)

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued ——▶

NEW

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

Complete Disc Interface Kit including DFS ROM and fitting instructions	**£48**
Acorn's 0.90 DFS Kit complete	**£49**
DFS Manual (Comprehensive)	*(no VAT)* **£6.95**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

Watford's sophisticated DFS ROM only	**£16**
We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only	**£12**

- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

NEW

Watford's MkII 1770 Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00.**

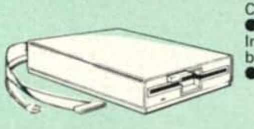
Special introductory offer	**£39.00**
DDFS Manual	(No VAT) **£6.95**
We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20**	Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95**	Twin CD (with PSU) **£3.90**

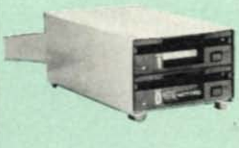
Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£125** (£6 carr)
(Offer valid while stocks last)

3½" DISC DRIVE OFFER



These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

CLS35 400K Unit	**£69**
CLD35 800K Unit	**£126**

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

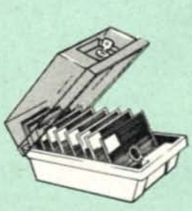
£6

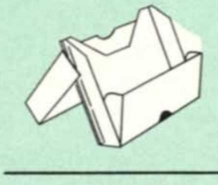
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

M35 - holds upto 50 5¼" discs	**£6.00**
M85 – holds upto 95 5¼" discs	**£8.00**
M25* – holds upto 25 3½" Discs	**£5.50**
M50 – holds 50 3½" Discs	**£7.50**
M10 – holds upto 10 Data Cartridges	**£15**

* Not lockable





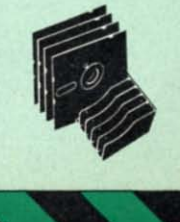
PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.



Protection at Only: **£2**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

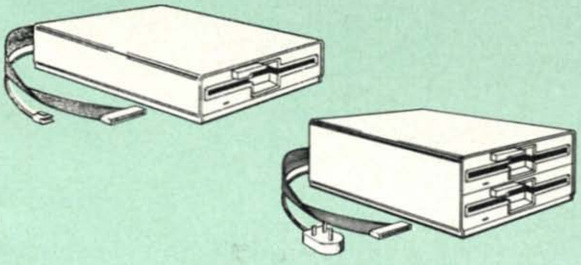
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £98	
400K (720K)	CLS400S £82	CLD 400 £168	CS 400S £92	CD400 £188
800K (1.44M)		CLD 800S £162		CD 800S £182

- TWIN Disc Drive Case, complete with Power Supply & Cables **£43**

Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

● *10 × 5¼" S/S D/D 40 Track Diskettes (744)*	***£6.00***
● *10 × 5¼" D/S D/D 40 Track Diskettes (745)*	***£7.50***
● *10 × 5¼" S/S D/D 80 Track Diskettes (746)*	***£11.50***
● *10 × 5¼" D/S D/D 80 Track Diskettes (747)*	***£11.75***
● *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT*	***£19***
● *10 × 3½" S/S D/D 40/80 track Discs*	***£10.00***
● *10 × 3½" D/S D/D 40/80 track Discs*	***£11.75***
● *10 × 3½" High Density Diskettes*	***£37***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

● *10 × **M3** 3½" D/S D/D 80 Track Discs*	***£11***
● *10 × **M9** 3½" Double Side High Density*	***£34***
● *10 × **M4** 5¼" S/S D/D 40 Track Discs*	***£5***
● *10 × **M5** 5¼" D/S D/D 40 Track Discs*	***£7***
● *10 × **M7** 5¼" D/S D/D 80 Track Discs*	***£9***
● **10 × M8 5¼" D/S H/D Hi-Density Discs**	**£14**
● *3" Double Sided Discs*	***£3** each*

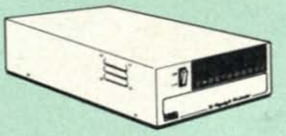
PRICES SLASHED

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48



WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

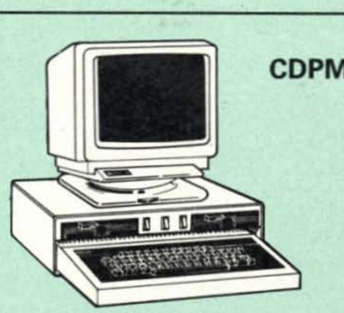
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a full user guide and full utilities including file copy, 1000K save routines, Format and Verify – in fact all you need and more.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

● 10 Megabyte **£350;** ● 30 Megabyte **£420**

CDP800S



CDPM800S

Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £192
CDPM 800S for Master £196
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 8 of our advert)

(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued →

NOMINATED FOR
MICRO
BRITISH COMPUTING AWARDS
1987

QUEST MOUSE

QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package
With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87
"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."
"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87
"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87
". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package..."
". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."
"Quest Paint is a major leap forward in BBC programming. . ."
"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87
"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest . . ."
". . . this package represents excellent value for money. If you are interested in art then this program is for you to buy".
"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".
"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".
"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".
"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".
"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus . . ."
"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".
"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program". The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:
"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Col. C.G. Holton, HQ 1 (BR) Corps, BFPO 39, writes:
"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:
"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem".

"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".

"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

QUEST MOUSE & QUEST PAINT	**£54**
QUEST MOUSE, QUEST PAINT, AMX PAGEMAKER & PAGEFONT	**£82**
QUEST MOUSE ONLY	**£25**
QUEST PAINT SOFTWARE	**£32**
QUEST FONT DISC	**£12**
ConQuest 32K ROM Package	**£29**
QUEST MAT	**£3**
Part-exchange your old Mouse for a New QUEST MOUSE for only	**£23**
GXR ROM for BBC Micro	**£22**

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21
(Price includes FREE software Disc and Operating Manual)

RB2 Marconi Tracker Ball

RB2 (AMX/Quest compatible)	£52
RB2 including Quest Paint	£78

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

THE NEW Mk III AMX MOUSE

ONLY: £59 **Inc. Super Art package**
(carr £1.50)
(Please specify for BBC, Master or Compact)

FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX UTILITY Package	£11
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32

We are giving away absolutely FREE, our PAGE-FONT disc with every purchase of STOP PRESS from us.

PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£12
AMX DESIGN (ROM)	£55
AMX 3D ZICON Disc	£19
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£15

DIAGNOSTICS DISC

The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult.
At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BEEB VIDEO DIGITISER

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out. The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

- ● DATABASE
- ● BEEBCALC SPREADSHEET
- ● BEEBPLOT GRAPHICS

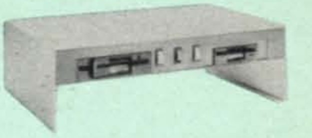
DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Continued ⟶

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)

Aries B-12
Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:		
Price:	Aries B-12	£40
	Aries B-12C	£5

ARIES B-488
IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

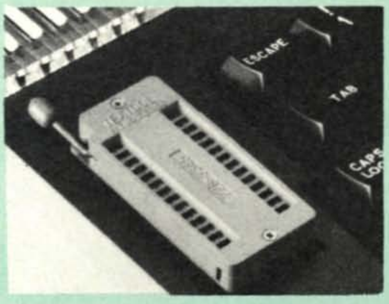
£238 (Carr £3)

EXTERNAL ROM BOARD for BBC MASTER

This external Beige finished, free standing cased unit with its own Power Supply allows you to plug-in upto 12 ROMs and 16K Sideways RAM.

Only £78

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£16** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	£11
● Spare Cartridges	£2.50
● Spare Rack	£1.50

ROM Cartridges for the BBC Master
Twin **£8**; Quad **£12**

16K DISC RAM

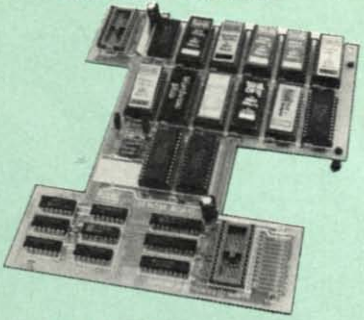
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- Supplied complete with Battery Backup.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£35** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

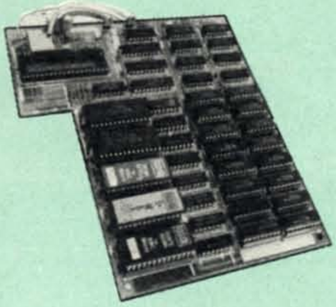
USER PORT SPLITTER UNIT

User Port Splitter
A
B

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

● ROM/RAM card with 32k dynamic RAM	***£48***
● ROM/RAM card with 64k dynamic RAM	***£65***
● ROM/RAM card with a massive 128k dynamic RAM	**£109**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

● 16k plug-in Static RAM kit	**£17**
● 16k Dynamic RAM for Upgrade	**£17.50**
● Battery backup	**£3**
● Read and Write protect switches	**£2** each
Complete ROM-RAM board All options installed	**£115**

P.S.

Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem

The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***

SPECIAL OFFER

Price: ***£82***
(carr £3)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£82** **(Carr £3)**

Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)

VOLTMACE JOYSTICKS

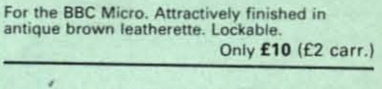
Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**

ATTACHE CARRYING CASE

For the BBC Micro. Attractively finished in antique brown leatherette. Lockable.

Only **£10** (£2 carr.)

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£46
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
SPEECH SYSTEM	£35
Printmaster	£25

Wordwise £23

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC:	**£5**
SPELL MASTER	**£42**

Inter SHEET ONLY £37

INTER-CHART ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM **£76**

INTERBASE £49

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	**£35**
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£59**
HI-VIEW (for 6502 2nd Processor)	**£36**
VIEWSHEET (Acornsoft)	**£36**
VIEWSTORE	**£36**
VIEWSPELL-with 80 track disc	**£29**
VIEWPLOT Disc (Please specify for Master 128 or Compact)	**£20**

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

VIEW-INDEX	**£12**
OVERVIEW Packs 1 & 2	**£69**

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

MINI OFFICE II

DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
ROM Version	£43.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

EPSON NLQ ROM

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789
A B
R S

Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: **£25**

VIEW PRINTER DRIVER for NLQ ROM **£7**

VIEW PRINTER DRIVER ROM

View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

ROM-SPELL

ROMSPELL
ENGLISH DICTIONARY

Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.

NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

DUMPOUT 3

A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

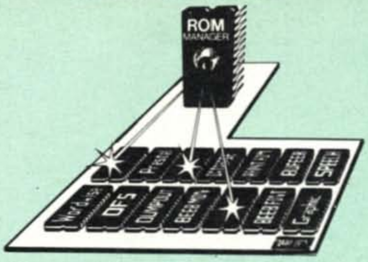
For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

BBC SOFTWARE'S
Popular Educational Software

● Maths with a Story 1 (Disc). 4 primary level maths programs	£11.25
● Maths with a Story 2 (Disc) 4 further maths programs	£11.25
● Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs	£17
● WAVES: Science Topics (Disc) CSC O Level Physics program.	£14.95
● RELATIONSHIP: Science (Disc) O Level Biology program.	£20.00
● BONDING: Science (Disc) O Level Chemistry program.	£20.00
● ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program.	£20.00
● ELECTRONICS IN ACTION (Disc) O Level program	£19.95
● NEWTON & THE SPACE SHUTTLE (Disc) O Level program.	£20
● ECOLOGY (Disc) O Level program.	£20
● POLYMERS (Disc) O Level program.	£20
● Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule.	£20
● FOOD & POPULATION (Disc) O Level program.	£20
● MICROTECHNOLOGY (Cassette) O Level program.	£11.25
● A VOUS LA FRANCE (2 Cassettes) A French language home study aid.	£21.70
● DEUTSCH DIREKT! (Disc & Audio Cassette)	£19.95
● Modem Master (Disc)	£11.25
● ADVANCED TELETEXT SYSTEM	£8.65
● PERIOD TABLE SOFTWARE	£20
● Astronomy – Primary (Disc)	£12
● Computers at Work – Primary	£17.35
● Introducing Geography – Primary	£17
● **Introducing Geography 11-17yrs**	£17.50
● Electric Fields 6-14 years	£11.25
● BlackQueen Contract Bridge	£13
● Espana Viva – 3 Discs	£19.95
● A Vous La France Disc	£21.50

ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER

The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

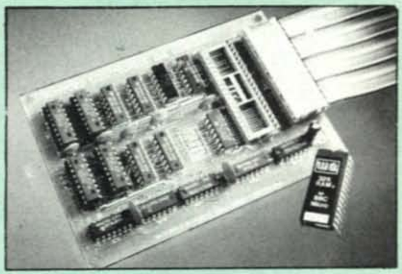
£75 (£3 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

32K
SHADOW RAM-
Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

Continued →

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£9.95
6502 Assembly Language Program	£19.95
6502 Application	£13.95
6502 Development Package	£7.50
6502 Programming the	£16.95
6502 Reference Guide	£10.95
68000 Assembly Language	£15.95
68000 Assembly Language Prog.	£19.95
68000 Assembly Language Techniques	£24.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
Advanced Disc User Guide	£18.95
Advanced Prog. Guide to BBC	£9.95
Adv. Sideways RAM User Guide	£9.95
Advanced User Guide for BBC	£10.95
Amiga Hardware Ref Manual	£23.70
Amiga Machine Lang. Guide	£19.95
ARM Assembly Lang. Prog. Manua	£12
Art of Microcomputer Graphics	£16.95
Assembly Language Prog. for the BBC	£9.95
AY-3-8910 Programmable Sound Generator Data Manual	£3
BASIC 2–User Guide	£2
Basic ROM User Guide	£11.95
BBC–Advanced Graphics with the	£10.95
BBC – Advanced Programming Techniques for	£8.95
BBC–Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro Basic Sound & Graphics	£7.95
BBC Micro–File Handling On	£7.95
BBC Micro Programs in BASIC	£5.95
BBC Micro ROM Book	£10.95
BBC Micro–within the	£13.95
BBC Master 128 for High Flyer	£10.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£8.50
C Big Red Book of	£7.50
C-A Dabhand Guide to	£14.95
'C' Introducing	£9.95
C for Programmers	£9.95
C Programming Lang.	£23.95
COMAL–Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
Deutsch Direkti (Book only)	£5.95
DNFS Instruction Booklet	£2
Disc Drive Projects for Micros	£6.50
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
File Handling on BBC Micro	£8.50
FORTH–Advanced	£9.95
FORTH–A Text Reference	£19.10
FORTH–Introduction to	£8.95
FORTH on the BBC Micro	£9.95
FORTH–Starting	£19.10
Hackers Handbook-New	£6.95
Hitch-Hikers Guide to A.I.	£8.95
Interfacing and Robotics	£15.95
Introduction to COMAL	£9.50
Introduction to FORTH	£8.95
Introduction to LOGO	£6.95
Introduction to PASCAL	£17.95
Inside Information, Computers & Coms.	£9.95
ISO-PASCAL Reference Manual	£9.95
LISP 2nd Edition	£15.95
LISP Looking At	£11.95
LISP on the BBC Micro	£7.95
LISP the Language of Artificial Intelligence	£13.95
Logo on the BBC Micro	£7.50
LOGO–Introduction to	£6.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering CP-M	£17.95
Mastering Interpreters & Compilers	£14.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14.00
Master Reference Manual Part 2	£14.00
Master Reference Manual–Advanced	£19
Mathematical Prog. in BBC Basic	£7.95
Micro Prolog	£10.00
Microtext for the BBC	£10.00
Microtext Plus Manual	£9.95
Microtext User Guide	£5
PASCAL–Introduction to	£17.95
PASCAL Programming	£9.45
Pick Operating Sys. Practical Guide	£14.95
Practical Disc File Techniques	£5.95
Quick Program Ref. Guide – dBASE III PLUS	£8.95
Quick program Ref. Guide – dBase III Within the BBC Micro	£13.95
Structured Basic	£7.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
The Software Business	£5.50
Towers Int. Transistor Selectors	£14.95
Understanding Interword – A Beginners Guide	£6.50
Using DOS+ on the 1512 (95% Ok for 512 Bd)	£9.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£4.50
Viewsheet & Viewstore Dabhand Guide	£12.95
Mastering View, Viewsheet & Viewstore	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Within the BBC Micro	£13.95
Wordprocessing On The BBC Micro	£6.25
Writing Interactive Interpreters & Compilers	£8.45
Wordwise + A User Guide	£10.95
Z80 Applications	£15.95
Z80 Assembly Language Prog.	£20.95
Z80 Programming the	£19.95
Z80 Reference Guide	£9.95
Z88 Computing	£9.95

BOOKS for IBM PC & Compatible (No VAT on Books)

1-2-3 For Business 2nd Edition	£18.45
1-2-3 Command Language	£18.45
1-2-3 Special Edition (QUE)–Using	£21.95
8086/8088 Assembly Language Prog.	£11.95
8086/8088 Programming the	£17.95
Ability–Using	£12.95
Accountancy software in Business – Using	£12.95
Advance C Tech & Application	£19.95
Advanced Tech. in Turbo Pascal	£19.95
Aldus Pagemaker–Using	£18.45
Amstrad Basic 2 Manuals	£12.95
Amstrad Technical Manuals	£19.50
Amstrad PC Programmers Ref Guide	£15.95
Amstrad PC1512-1640 Step by Step – Using	£8.50
Art and Desktop Publishing	£18.45
Autocad–using	£18.95
Business companion on the 1640	£12.95
CP-M Bible	£16.50
CP-M Handbook with MPM	£9.95
CP-M Plus Handbook	£13.95
CP-M Soul of	£16.50
CP-M The software BUS	£8.95
dBase II & III–Understanding	£7.95
dBase II–Working with	£9.95
dBase III–Mastering	£19.95
dBase III Plus	£12.95
dBase III Plus Handbook 2nd Edition	£19.95
dBase III Plus – tips, tricks and traps (QUE)	£18.40
dBase III Plus–Quick Ref. Guide	£4.95
dBase III Plus–Quick Prog. Guide	£8.95
DOS Instant Reference (up to 3.3)	£10.95
DOS, Mastering for Versions up to 3.3	£19.95
DOS Plus Manual/Amstrad PC	£17.00
DOS Plus–Mastering	£12.50
Excel IBM Version–Using the	£17.95
Hard Disk Manage IBM PC XT AT	£17.35
Hard Disc–Managing your	£18.45
IBM Mac Connection	£17.35
IBM PC & Macintosh Networking	£17.95
IBM PS/2 Handbook	£17.95
IBM PC AT–Inside the	£20.95
Local Area Networks 2nd Generation	£19.95
Lotus 1-2-3 Desktop Companion Soft/B	£24.95
Lotus 1-2-3–Illustrated	£18.45
Laserprint it	£15.95
Managing your Hard Disk	£18.45
Mastering 1-2-3 2nd Edition	£18.95
Microcomputer CAD Manual	£25.95
Microsoft Windows–Illustrated	£18.45
MS-DOS–ABC on	17.95
MS-DOS Advanced Programming	£19.95
MS-DOS Advances (Microsoft)	£19.95
MS-DOS Handbook 3rd Edition	£18.95
MS-DOS Instant Reference Guide	£10.95
MS-DOS Illustrated	£18.45
MS/PC DOS 3.3–Illustrated	£18.95
MS-DOS Mastering–Tricks of	£22.50
MS-DOS Performance Programming Under	£19.95
MS-DOS Quick Prog Ref Guide	£8.95
MS-DOS Quick Reference Guide	£3.95
MS-DOS–Running 3rd edition	£21.95
MS-DOS–Supercharging	£17.95
MS-DOS Users Guide 2nd Edition	£16.95
MS-DOS–Using	£9.50
Operating the IBM PC Network	£18.45
Pagemaker–Desktop Publishing	£15.95
Pagemaker IBM PC–Mastering	£18.45
Pagemaker–Illustrated	£18.45
Quattro–Mastering	£21.95
Smart–Using	£21.45
Smart–tips, tricks and traps (QUE)	£22.45
SuperCalc 4	£19.95
SuperCalc 4–Using	£17.45
Symphony 3rd Edition–Mastering	£22.95
Turbo Pascal Complete 2nd Ed.	£21.45
Turbo Pascal Library	£14.95
Using 1-2-3 2nd Edition	£21.95
Using Microsoft WORD 2nd Edition	£18.45
Using PC-DOS 2nd Edition Ver. 3.3	£20.45
Using Pagemaker on the IBM PC	£22.45
Using SuperCalc 4	£17.45
Ventura–Mastering	£21.95
Ventura Publishing–Instant	£34.75
Ventura Tips + Tricks	£18.95
Word Perfect Desktop Companion	£25.95
Wordperfect–Illustrated	£18.45
Wordperfect 3rd Ed–Using	£18.45
Wordperfect Made Easy	£15.95
Wordstar & CP/M made easy	£9.95
WordStar Release 4–Mastering	£17.95
WordStar 1512/1640–Using	£9.50
WordStar User's Ref. manual	£12.50
Wordstar–Quick program Ref. Guide	£8.95
WordStar 4.0–Using	£17.45
Xerox Ventura–Desktop Publishing	£14.50
Xerox Ventura Publishing–Inside	£18.45

NEW

The Advanced Reference Manual for the BBC Master

At last Acorn's long awaited Advance Reference Manual for the BBC Master Series of Microcomputers has now been published. Watford Electronics' own authors have edited and added missing sections to the original script and produced a very high quality publication.

It features information about:

- Memory Organisation
- Slow data bus
- Detailed circuit description
- Keyboard controller
- Screen display
- User port
- Serial Processor
- Peripheral bus controller
- 1 Mhz Bus
- Machine operating System
- Second processors – Internal, Z80 and 80186
- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K.
A worth-while addition to any Master owner's library.

All this for just £19 (NO VAT)

THE COMPLETE BBC COMPUTER USER HANDBOOK

"Why has no-one written a book like this before? It's long overdue".
If you own a BBC-B, BBC B+, Electron, Master 128, Master Compact or Archimedes then this book is for you. It shows you how to get the most from your computer, and how to make the computer work for you. Although some sections are machine specific, most of the information, programs, hints and good solid experience are for the whole range of BBC machines. The general style and level means that both beginner and expert will feel satisfied with the quality and quantity of the material.

GENERAL – Uses and abuses of computers.

HARDWARE – How to design your own work station. Hardware additions (disc drives, ROMs, printers, 2nd processors, etc). DIY alterations.

HARDWARE RUNNING BBC-BASIC – All BBC machines are described with their differences. Compatibility between the various BBC machines. Networks. The Archimedes and its advantages.

GETTING ORGANISED – so that you keep track of your programs and control of your software. Setting up for easier programming sessions.

NEAT PROGRAMMING – Good style. Writing structured programs. Getting the best from BBC-BASIC, Graphics and screen displays. Speeding up programs. Saving space.

GENERAL PROGRAMMING TIPS AND HINTS – with a multitude of examples (eg input vetting, dealing with dates, blanking out function key messages, error trapping, disabling ESCAPE and BREAK, use of EOR with colour, etc).

DEBUGGING – Specific errors and how to handle them. How to test programs fully.

STANDARD PROGRAMS – Assessing word-processors, spread-sheets, databases, graphics packages, communications etc. How to customise them to your own requirements.

COMPUTERS AT HOME AND IN THE OFFICE – Introducing the computer to the office. Program protection. Computers and the law. Communications. Selling your own programs. 28 FULL CHAPTERS, elegantly written and extensively indexed. To dip into, consult, or read from cover to cover, again... and again... and again...

Only: **£14.95**

Watford Electronics are the main Approved Stockist of ACORN SPARES and Acorn ECONET Referral Centre

Servisol Foam Cleaner

This 415Ml, king size multi-purpose foam cleaner spray is ideal for cleaning the Keyboard, Monitor, Disc Drive and your computer furniture surfaces. Simply spray on the surface to clean and wipe off with a clean cloth.

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

Aerosol Dust Spray
This simple to use aerosol spray is ideal for removing Dust and Dirt deposits from the Keyboards and similar inaccessible places. **£3**

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

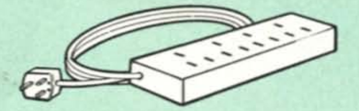
SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources which put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£7.50**

---

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

£7.95 (carr £1.50)

SPIKES CLEANER UNIT

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete computer system

£13.00 (carr. £1.50)

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

£2

Replacement FLEXIBLE 17 way Keyboard Connector £3

28pin DIL HEADER PLUG

SOLDER type **£1.50**; IDC CRIMP type **£1.95**

---

8 WAY DIP SWITCH

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ Keyboard.

Only **£1.00**

---

28 pin ZIF SOCKET (Textool) £6.95

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK £8

CONNECTING LEADS

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 5 pin DIN Plug + 1 Jack Plug	£2.00
to 3 pin DIN Plug + 1 Jack Plug	£2.00
to 7 pin DIN Plug	£2.50
to 3 Jack Plugs	£2.00
6 pin DIN to 6 pin DIN Plug (RGB)	£2.50

DISC DRIVE POWER LEADS

Supply from BBC power supply to standard Disc Drive connector.
Single **£3.00** Dual **£3.75**

DISC DRIVE INTERFACE LEADS

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	30p	45p
RS423 (5 pin Domino)	40p	50p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	20p	30p
Paddles (15 pin 'D')	80p	200p
Disc Drive Plug 4 way	75p	–
6 way Power Connector	80p	95p

SPARES for BBC Micro

Keyboard	£43
Master Keyboard	£62
UHF Modulator	£4
Speaker Grill	£1
Power Supply	£56
BBC Casing	£20
Speaker	£2
Keyswitch	£1.50
16MHz Crystal	£4
32.768MHz Xtal	£1.00
Master PSU	£59

CHIP SHOP

DS3691	£4.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
WD1770	£12.00
2764-250nS	£3.50
27128-250nS (12V5)	£3.25
27128-250nS (21V)	£5.25
27256-15	£5.00
27512	£10.50
27C101G (1 Meg)	£17.50
4013	60p
4020	£0.90
4164-15	£3.25
4464-12	£8.95
4464-15	£8.25
4816 RAM	£2.00
41256-15	£8.25
41256-12	£9.75
6264LP-8K	£8.50
6502A CPU	£4.50
65C02 3M	£9.75
65C12	£9.00
6512A	£10.00
6522	£3.40
6522A	£4.50
65256ALS-15	£12.50
6818	£4.00
6845SP	£6.00
68B50	£2.95
68B54	£7.50
7438	40p
74LS00	25p
74LS04	25p
74LS10	25p
74LS123	80p
74LS163	70p
74LS244	80p
74LS245	£1.00
74ALS245	£2.75
74LS373	£1.00
74LS393	£1.00
75453	70p
75159	£2.00
8271	£39
9637	£2.00
ICL7673PA	£2.00

ASSORTED ROMS

ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
Acorn COMAL	£38
ACORN DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C	£52
Acorn LISP	£19
Acorn LOGO	£49
Acorn OS B+	£25
Acorn OS 1.2	£14
Basic Editor	£24
Beebfont	£25
Beebmon	£22
BROM Plus	£32
Buffer & Backup	£20
Communicator	£49
Commstar II	£28
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
Help II	£27
ISO Pascal	£51
ISO-Pascal Stand Alone Generator	£30
ICON Master	£28
Logotron LOGO	£45
Master OS ROM	£38
Master Termulator	£32
Micro Prolog	£62
Microtext Disc	£46
Microtext Rom	£199
Mini Office II ROM	£43
MUROM	£21
ROMIT	£29
Serial ULA	£13
TED	£35
Termulator B, B+	£25
Termulator Master	£32
Toolkit Plus	£31
Video ULA	£14
ULTRACALC II	£26
1Mb OS ROM	£39

Watford Dealers' List

UNITED KINGDOM

Alpha Microtec Ltd, 321 Stratford Road, Shirley, Solihull, West Midlands. Tel: 021-745 8998.

Badger Micros (Devon), Badger's Hill, Southerton, Ottery-St. Mary, Devon EX11 1SE. Tel: 0395 68516.

Beebug Retail, Dolphin Place, Holywell Hill, St. Albans.

Cambridge Computer Store, 4 Emmanuel St., Cambridge CB1 1NE. Tel: 0223 358264.

Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts.

C.J.E. Micros, 78 Brighton Road, Worthing, West Sussex. Tel: 0903 213361.

HCCS, 575-583 Durham Road, Low Fell, Gateshead, Nr. Newcastle Upon Tyne. Tel. 091 4870760.

Mancomp Ltd, Printworks Lane, Levenshulme, Manchester. Tel: 061-224 1888-9888.

Microman Computers, Pasture Lane Farm, Pasture Lane, Rainford, St. Helens, Merseyside WA11 8PU. Tel: 074488 3667.

The Computer Depot, 205 Buchanan Street, Glasgow G1 2JZ. Tel: 041-332 3944.

Verospeed Ltd, Boyatt Wood, Eastleigh, Hants.

Continued ⟶

ARIES PC

Watford Electronics are pleased to announce the launch of their NEW ARIES range of High Quality IBM Compatible XT, AT and 386 range of PCs. To get you started a special version of 'PC Organiser' package, consisting of: Wordprocessor, Database, Auto Dialler, Various Utilities and Desk Diary software worth £60 is supplied FREE with every PC. Also included in the price is a 12 MONTH ON-SITE MAINTENANCE WARRANTY. Available separately are a range of Hi-resolution Colour/EGA and Flat Screen, attractively finished, state of the art, monochrome Green, Amber and Paper White monitors. Hard Discs ranging from 20 Megabytes to 160 Megabytes can be purchased at very competitive prices. (Write in for our PC Catalogue).

ARIES PC-XT 88

Features:

- Three times faster than IBM PC/XT.
- Memory expandable to 1024K on system board, extra RAMDISK available.
- High resolution colour monitor with EGA incorporated will give you 640×350 pixel quality display.
- Enhanced floppy disc controller provides you with better selection in floppy drives. 1.2M or 360k. (3.5" optional)
- New enhanced keyboard with 12 programmable function keys, same as IBM 101 keyboards.
- CLOCK on system board, gives non-stop DATE and TIME.
- Keylock, LED indicator, H/W reset and speaker volume control make the system even more friendly in use.
- MS-DOS 3.2 and GW-BASIC 3.2 licenced from Microsoft Corp.
- FCC approved.

Specification:

- 16 Bit Intel 8088-2 or NEC V20 78108 microprocessor, running at 8MHz or 4.77MHz.
- 8087-2 maths co-processor, optional.
- 640K minimum expandable to 1024K on system board, extra 384K RAMDISK available.
- 360K Single Floppy (optional 2nd Floppy/3.5"/20MB Winny/T. Streamer).
- 8 expansion slots.
- RS232 with two ports.
- Microsoft MS DOS 3.21.
- 102 keys keyboard.
- 150W power supply.
- GW-BASIC 3.21.
- Mono graphics/parallel card.
- Legal BIOS and built in games port and clock.
- High resolution (1000 x 350 lines) State of the art, 14" Flat Screen Monitor.
- **12 month On-site FREE maintenance warranty. (UK mainland)**

Available in the following configurations:

● ***Aries PC-XT 88 System incl. 14" hi-res monochrome monitor***	***£489***
● ***Aries PC-XT 88 System as above plus a 720K 3.5" Disc Drive***	***£579***
● ***Aries PC-XT 88 System as above plus a 20MB Hard Disk fitted***	***£799***
● ***Aries PC-XT 88 System as above plus a 40MB Hard Disk fitted***	***£849***

- **ARIES PC-XT 88 / EGA HI-RES COLOUR SYSTEM**
  Specification as above including, Aries EGA Monitor/ EGA Card and 40MB Hard Disk Drive fitted.

At a breakthrough price: ***£999***

ARIES PC AT286

Features:

- Performance exceeding ordinary 8MHz ATs by more than 50 per cent.
- Keyboard switchable processor speeds of 6/8/10/12MHz.
- Front Panel Display showing use of Comm/Printer Ports/Hard Disc access/Processor speeds.
- Main board accomodates upto 1Mb of RAM.
- One 1.2M floppy disc drive with optional 360K, 720K and 1.44M disc drive as well as tape streamers.
- Enhanced, low profile, 101 keys keyboard.
- Optional 20/30/40/80MB Hard disc systems.
- Eight industry standard expansion slots.
- FCC Approved.

Specification:

- 80286 microprocessor.
- Optional 80287 Maths co-processor
- 640K RAM standard expandable on-board to 1MB.
- 1.2M Single Floppy (optional 2nd Floppy/3.5"/Winny/T. Streamer)
- 8 expansion slots.
- Serial/Parallel Card.
- Switchable Speed 6-12MHz.
- Microsoft MS DOS 3.21.
- 102 key keyboard.
- HDD/FDD Card.
- 200W power supply.
- GW-BASIC 3.21.
- Mono graphics/parallel card (Herc. Compt.)
- Slide in metal case with function display.
- Legal BIOS and built in games port and clock.
- High resolution (1000 x 350 lines) State of the art, 14" Flat Screen Monitor.
- **12 month On-site maintenance warranty. (UK mainland)**

Available in the following configurations:

● ***Aries PC-AT 286 System incl. hi-res monochrome monitor***	***£799***
● ***Aries PC-AT 286 System as above plus a 720K 3.5" Disc Drive***	***£889***
● ***Aries PC-AT 286 System as above plus a 20MB Hard Disk fitted***	***£999***
● ***Aries PC-AT 286 System as above plus a 40MB Hard Disk fitted***	***£1199***

- **ARIES PC-AT 286 / EGA HI-RES COLOUR SYSTEM**
  Specification as above including Aries EGA Monitor/ EGA Card and 40 MB Hard Disk Drive fitted.

At a breakthrough price: ***£1399***

Prices subject to change without notice and available on request. ALL OFFERS subject to availibility.
Mail Order and RETAIL SHOP. Trade and Export inquiries welcome.
Government and Educational Establishments' OFFICIAL ORDERS Accepted.
Shop Hours: 9.00am to 6.00pm. Monday to Saturday. Thursdays 9am to 8pm. (Free Customer's Car Park)

VAT: UK customers please add 15% VAT to cost incl. Carriage.
CARRIAGE: Unless stated otherwise, minimum £1 on all orders. £3 on Larger items. On bulkier items, £7 Securicor charge applies (UK mainland only). Overseas orders, carriage is charged at cost.

Specifications of all products are given in good faith but is subject to change without notice. Some items vary in their availability. Please ring for latest delivery situation.

Watford Electronics

JESSA HOUSE, 250 Lower High Street,
WATFORD WD1 2AN, ENGLAND
Telephone: (0923) 37774; Telex: 8956095;
FAX: 01 950 8989

ORDER VIA
MicroLink
72:MAG030

Computers and Upgrades

Archimedes 305	£669.00 (a)
Archimedes 305 Mono System	£759.00 (a)
Archimedes 305 Colour System	£919.00 (a)
Archimedes 310	£835.00 (a)
Archimedes 310 Mono System	£895.00 (a)
Archimedes 310 Colour System	£1055.00 (a)
Archimedes 310M	£895.00 (a)
Archimedes 310M Mono System	£955.00 (a)
Archimedes 310M Colour System	£1115.00 (a)

0% FINANCE ON THE ARCHIMEDES RANGE
(Subject to status) Phone for details

Archimedes 440	£2529.00 (a)
Archimedes 440 Mono System	£2589.00 (a)
Archimedes 440 Colour System	£2749.00 (a)
Archimedes podule backplane	£39.00 (d)
Archimedes ROM podule	£59.00 (d)
Archimedes I/O podule	£85.00 (d)
Archimedes Midi add-on to I/O podule	£39.00 (e)
Archimedes Midi podule	£69.00 (d)
Master 128	£369.00 (a)
Master Compact	From £310.00 (a)
Master Turbo Upgrade	£110.00 (c)
Master 512 Upgrade	£95.00 (c)
Master 128 Eprom Cartridge	£11.00 (c)
Master 128 Dust Cover	£4.50 (e)
Compact RS 232 Interface	£26.00 (c)
Compact TV Modulator	£26.00 (e)
1770 Disc Interface	£41.00 (d)
ADFS ROM (B+ or B with 1770)	£25.00 (e)
B+64 64K Upgrade	£30.00 (d)
Trade-in your old Model B against a new Master 128, Master Compact or Archimedes	
Cambridge Computers Z88	£244.00 (a)
Z88 PSU	£8.65 (d)
128K RAM	£43.00 (e)
128K Eprom	£43.00 (e)

Printers (Dot Matrix)

Citizen 120D 80col/120cps + 25cps NLQ	£130.00 (a)
Citizen MSP15E 136col/160cps + 40cps NLQ	£230.00 (a)
Citizen MSP40 80col/200cps + 50cps NLQ	£300.00 (a)
Citizen MSP45 136col/200cps + 50cps NLQ	£400.00 (a)
Citizen MSP50 80col/250cps + 60cps NLQ	£400.00 (a)
Citizen MSP55 136col/250cps + 60cps NLQ	£520.00 (a)
Citizen HQP40 24pin 80col/200cps + 60cps LQ	£379.00 (a)
Citizen HQP45 24pin 136col/200cps + 60cps LQ	£454.00 (a)
Star LC10 120cps + 30cps NLQ	£199.00 (a)
Star ND10 80col/180cps + 45cps NLQ	£320.00 (a)
Star ND15 136col/180cps + 45cps NLQ	£380.00 (a)
Star NR10 80col/240cps + 60cps NLQ	£395.00 (a)
Star NR15 136col/240cps + 60cps NLQ	£460.00 (a)
Star LC24-10 80col/142cps + 47cps LQ 24pin	£330.00 (a)

Printers (Daisy Wheel)

Juki 610C 110col 20cps	£290.00 (a)
Citizen Premier 35 132col 35cps	£554.00 (a)
MP26 – 26cps Diablo 630 compatible	£234.00 (a)
MP40 – 40cps Diablo 630 compatible	£319.00 (a)

2 Year Warranty on Citizen, Juki and MP Printers

Printers (Laser)

Citizen Overture 110+ 10pages/min	£1450.00 (a)
Star Laser Printer 8 8 pages/min	£1900.00 (a)

All laser printers with1 year on site maintenance

AMX Mouse and Software

AMX Mouse + Super Art	£60.00 (d)
AMX Pagemaker	£37.00 (d)
Extra Extra	£21.00 (e)
Mouse Mat	£4.34 (e)

Disc Drives

Mitsubishi Drives

Single DS 40/80T	£96.00 (a)
Single DS 40/80T inc PSU	£111.00 (a)
Dual DS 40/80T	£189.00 (a)
Dual DS 40/80T inc PSU	£209.00 (a)
Dual DS 40/80T inc PSU & Plinth	£214.00 (a)
20Mb Winchester	£449.00 (a)
Combination 3.5 5.25 Winchester available	Phone for details

2 year Warranty on all Drives

B & S

COMPUTING

BUSINESS SYSTEMS · HARDWARE
SOFTWARE · VIDEO SYSTEMS
MEDIA SUPPLIES
OFFICIAL DOMESDAY DEALER
APPROVED ECONET DEALER

Acorn
The choice of experience

ACORN APPROVED DEALER

Phone 0602 787923

Discs

Discs 5.25" (Boxed in 10's Lifetime guarantee)

3M744 SS/DD 48TPI	£8.00 (d)
3M745 DS/DD 48TPI	£9.00 (d)
3M747 DS/DD 96TPI	£13.00 (d)
Add £1 for plastic library case	
B & S Label 96TPI in see through LIB. Case DS/DD	£10.00 (d)
Disc Cleaning Kit (state 5.25" or 3.5")	£5.00 (d)

3.5"

3M 35SS SS/DD (Box of 10)	£13.00 (d)
3M 35DS DS/DD (Box of 10)	£16.00 (d)
B & S Label DS/DD	£13.00 (d)

Lockable Anti-Static 5.25" Storage Cases

50 Disc Capacity	£8.00 (d)
100 Disc Capacity	£10.00 (d)

Monitors

All Monitors include BBC Lead

Philips Range of high resolution Mono Monitors with Audio Input Green, BM 7502 (Green)	£69.00 (a)
Philips Colour Monitor RGB, Composite Video, Audio in Linear RGB Green Screen SwitchableBBC/IBM Compatible CM8833	£220.00 (a)
High Screen ST88 Monitor Spec as Philips CM8833	**£195.00 (a)**
Philips Multisync CM8873 CGA/EGA/PGA Compatible	£520.00 (a)

Ideal for use with Acorn Archimedes computers.

Microvitec

1431 (Metal or Plastic Case please specify) Std. Res.	£184.00 (a)
1451 (Metal or Plastic Case please specify) Med Res.	£229.00 (a)
1441 (Metal or Plastic Case please specify) High Res.	£379.00 (a)
1431 AP Metal Case RGB and CV/Audio Std. Res.	£209.00 (a)
1451 AP Metal Case only RGB and CB Audio Med. Res.	£259.00 (a)
TILT and SWIVEL Stands for Plastic Case Only	£19.00 (a)

Plinths

BBC B Single	£11.00 (c)
BBC Master Single	£12.00 (c)
BBC Master with Shelf	£22.00 (b)

UK Customers: Please add 15% VAT to all prices (including carriage). Government and educational establishments official orders welcomed. When ordering please enclose a cheque or postal order for the appropriate amount, UK Carriage Rates (a) £8.00 – courier insured delivery (b) £3.50 (c) £2.50 (d) £1.50 (e) £1.00. All prices are correct at time of going to press. All offers are subject to availability, all prices are subject to change without prior notification and are available on request. Current price list is available on request. Goods normally despatched on receipt of order.

We are Licenced Credit Brokers (Please call for written details)
£1000 Instant credit available – No deposit required. APR 32.1%

B & S COMPUTING (NOTT'M) LTD
THE LENTON BUSINESS CENTRE
LENTON BOULEVARD
NOTTINGHAM NG7 2BY
PHONE: 0602 787923

ROM Boards

ATPL Sideways Model B	£35.00 (d)
ATPL Sideways Model B+	£31.00 (d)
Viglen Spare Cartridges	£2.50 (e)

Peartree Products

MR5000 Master ROM Cartridge	£8.95
MR6000 Master ROM Cartridge	£11.95
MR7200 Master RAM Cartridge	£33.95
MR8000 Master RAM Cartridge	£49.95
MR3000 Mini ROM Board BBC B only	£15.95
MR4300 Mini ROM/RAM Board BBC B only	£39.95
MR4800 Mini RAM Board BBC B only	£89.95

Printer Ribbons and Accessories

Epson LX 86 (Compat)	£2.50 (e)
Epson MX 80/RX 80/FX80/FX/85 (Compat)	£3.00 (e)
Juki 5510/Citizen MSP 20 (Compat)	£3.00 (e)
Citizen 120D/LSP10	£3.75 (e)
Taxan 810/Canon (Compat)	£3.75 (e)
Juki 6100 Multistrike	£2.30 (e)
Tally MT85 Fabric	£5.00 (e)
Tally MT85 Carbon	£7.00 (e)
Printer lead 1.5m B/B+/M128/ELK+1	£6.00 (e)
Printer lead 1.5m Compact	£8.00 (e)
Printer lead 1.8m IBM or Compatible + Archimedes	£10.00 (d)
80col Printer Stand with Paper shelves	£29.00 (c)
Printer Switch Box 2 Way "T" Switch	£34.00 (c)

Modems

All Modems inc BBC Lead

Miracle WS2000	£95.00 (c)
Miracle WS4000 Hayes compatible	£144.00 (c)
Pace Nightingale + Commstar II	£94.00 (c)
Pace Commstar II ROM	£28.00 (e)
Pace Linnet	£124.00 (c)
Pace Series 4 2123S	£230.00 (a)
50ft. Telephone Extn. Cable on Wind up Reel	£9.50 (d)

Software

Acorn Soft

Micro Prolog	£50.00 (d)	ISO Pascal	£42.00 (d)
Logo	£44.00 (d)	BCPL	£39.00 (d)
View Printer Driver (D)	£8.00 (e)	Comal	£32.00 (d)
Lisp	£33.00 (e)	Hi View	£37.00 (d)
View Professional	£75.00 (c)	View 3.0	£39.00 (d)
Viewsheet	£37.00(d)	View Store	£37.00 (d)
Vew Spell (80T only)	£29.00 (d)	View Plot	£21.00 (e)
View Index	£10.00 (e)	Overview	£69.00 (c)
Word Plus (Arch)	£75.00 (c)	Logistix (Arch)	£95.00 (d)

Computer Concepts

Interword	£39.00 (d)	Inter Sheet	£39.00 (d)
Interchart	£26.00 (d)	Interbase	£49.00 (d)
Mega 3	£75.00 (c)	Spellmaster	£42.00 (d)
Wordwise	£30.00 (c)	Wordwise +	£37.00 (d)

Archimedes versions available – Call for price and availability

Mirrorsoft

Fleet Street Editor	£31.00 (d)	Fonts and Graphics	£11.75 (e)

Clares

Fontwise +	£16.00 (e)	Replica III	£11.00 (e)
Artisian (Arch)	£31.00 (e)	Artisian Support	£16.00 (e)

VINE MICRO REPLAY (State M/C and Disc Interface)	£30.00 (e)

NB It is essential to state machine and 40/80T when ordering software

Books (No VAT on Books)

Master Ref. Manuals Pt1	£14.00 (d)	Pt2			£14.00 (d)
Advanced Master Ref. Manual (Bray & Dickens)					£19.95 (d)
Lisp	£8.00 (e)	Forth	£8.00 (e)	ISO Pascal	£8.00 (e)
BCPL	£14.00 (d)	View Guide	£6.00 (e)	Into View	£6.00 (e)
View 3	£9.00 (e)	View Sheet	£9.00 (e)	View Store	£9.00 (e)
Archimedes Ref. Manual					£29.95 (d)
Arm Assembly Language Manual					£12.95 (e)
Mastering View, Viewsheet and Viewstore					£12.95 (e)
Understanding Interword					£6.50 (e)
View A Dabhand Guide					£12.95 (e)
Z88 Computing					£9.95 (e)

Fanfold Paper and Labels

2000 x 1 Part 60gm 11 x 9.5" Micro Perf.	£12.00 (c)
1000 x 1 Part 85gm 11 x 9.5" Micro Perf.	£9.00 (c)
1000 x 1 Part 90gm "Perfect" A4 Micro Perf	£12.00 (b)
1000 89mm x 36mm Labels	£4.00 (d)
1000 89mm x 49mm Labels	£6.00 (d)
1000 102mm x 36mm Labels	£5.00 (d)

Please state Single or Twin Row, when ordering Labels

VISA

Logical thinking

The Mad Hatter offers solutions to your adventure problems

LOGICAL maps have certain advantages over pictorial ones in adventure games, and the particular one I want to illustrate here, from *The Hobbit*, has to do with the way adventure writers try to confuse you by pretending you've moved when you haven't. I've never been able to think of an adequate pictorial representation of this but the comment *Repeat* on a logical map is something I find perfectly acceptable.

So look at the one on this page before I tell you how to finish off Smaug, who is rather annoyed that you have pinched some of his jealously guarded treasure. Readers of the book will guess that it's meant to be the Arkenstone.

I am going to leave you to find your way to the side door in the mountain, but you should notice that a move counter is at work in this part of the game. After a certain number of moves a keyhole appears in there and at this point you *must* have Thorin with you. You tell him UNLOCK DOOR and then the correct input is GO THROUGH DOOR and off you trot a-burgling.

If you take too long locating the side door, you'll find that the keyhole has vanished. I would recommend that you save at the Dragon's Desolation then map the area carefully. Once you have explored it and found the door go back to the saved position, take the shortest route and wait for the keyhole to appear.

One last point concerning the map: The descriptions given are the shortened ones which appear when you visit the location for the second – and any subsequent – time.

Now for **Smaug**: After taking the treasure move

Hobbit Mountain Maze

07	Dragon's Desolation	N	08
		D	03
08	Dale Valley	N	09
		S	07
		NW	10
09	Front gate	S	08
		W	10
		N	24
10	Ravenhill	N	11
		SE	07
		E	09
11	Empty place	S	10
		NW	12
		W	13
12	Empty place	S	11
		N	15
		E	16
13	Empty place	E	14
		D	17
		SE	11
14	Empty place	S	18
		NW	19
		W	13
15	Empty place	N	Repeat
		SW	12
		W	17
16	Empty place	W	12
		NW	18
		NE	20
17	Empty place	U	13
		NE	20
		D	15

Hatter's Helpline

Aaron Haynes has trouble with the dragon in **Twin Kingdom Valley**. The wooden staff is the answer. The long-promised full treatment of this adventure will begin in the New Year.

Once again the resourceful Barbara Gibb has come to the aid of a reader, this time Jonathan Lee in trouble in **Ten Little Indians**. The silver figurine is in the utensil store beyond various rooms from the green bathroom. However, Barbara warns he *must* open the passage to the back stairs first – the suit of armour is a help here.

She also notes that the black figurine is hidden in the river mud; make sure you don't carry too much or linger too long here. Finally, it isn't actually necessary to open the gates: From the country road you ENTER GATEHOUSE, go UP to the tower and then, provided you have the rope, you can get down to the gravel drive.

May I again remind readers that I cannot answer individual letters unless they have included a stamped self-addressed envelope. Complaints via a second letter to the editor will not make the slightest difference – it's cheaper to include the sae the first time. Overseas readers should remember that the International Reply Coupon system serves the same purpose. If you don't do either of those things, you'll eventually get an answer to your problems in this column – that is more or less guaranteed – but don't hold your breath while waiting.

UP, which puts you High up on the Lonely Mountain. From there move SW, SE, D, S and E to Lake Town. Here you have something of a choice. My colleague Pendragon of *Electron User actually* **carried** Bard. If you try this, don't have too much else about your person and make sure you eat some lunch.

Asking Bard to move in a particular direction also works most of the time, but the prime objective is to get Bard with his bow and arrow to the Dragon's Desolation. Here you must DROP BARD – if you're carrying him – and the treasure for safety's sake, and say to Bard N, N AND SHOOT DRAGON. Then if you wear the ring and toddle along after him, you should be just in time to give Smaug the last rites.

On the way home, don't forget to pick up the treasure and make your way to Running River. From there you must proceed as follows: S, S, WEAR RING, W, WAIT, WAIT, W, WAIT, WEAR RING, W, N, W, SW – thus thwarting the Pale Bulbous Eyes. After that you should realise where you are and how to get home.

Provided you have got the golden key from the Misty Mountains and you remember to deposit the treasure in the chest at Bag End I believe that you will have obtained top marks.

Problem Corner

Gollum is in trouble with two games, neither of which I have solutions to. In *Valley of the Kings*, by MP Software, how does he get out of the first pyramid and into the second?

In CDS's *Castle Blackstar*, how does he use the broomstick and get at the vase behind the grating in the forest – and where is the orb?

Deeper into the Dungeon

Shake, Rattle and Roll was a hit record in my extreme youth – and a little shaking is what we have to cure in this section of **Dungeon Adventure**. The funny thing is that my predecessor on this column, a shrinking little violet yclept Alice, was so flummoxed by this problem that she got her pretty little self all in a tizzy.

Stuart Booth and I showed you how to obtain the sword by stopping the rolling stone in last month's issue of *The Micro User*. From there move NE from the Junction in the U-shaped passages and you will find yourself in a tall cavern with openings all around.

Here lurks a carnivorous jelly. Unless you have the solution to this particular problem, you'll get very little further – with ease, at any rate – in Dungeon Adventure even though you have worked out what the teleport system involves.

Remember that poor old corpse? Dump it here to occupy the Jelly's attention and nine directions are placed immediately at your service. Stuart and I now part company concerning the order in which things are done – so I am going to follow his directions for the most part, unless I say otherwise.

From the Jelly Cavern move SE to get the hammer from the deserted tool room and then return. After that, go W, W, W, and W to the neat panelled room. Here, go S into the cupboard and take the stick and rub the blue collar. Leaving the cupboard, go W from the neat panelled room and S past the vampire. Provided you are carrying either the cross or the crucifix, you'll have no trouble with this haemodeficient creature.

Here you'll find the lower chamber and the skeletons. Wave the staff and the wand and then drop them – you'll need them later. Return E enough to confront the vampire and this time throw the cross at it, which will utterly destroy the bloodless thing once and for all, but after that pick up the cross again.

More next month.

Trading in Elite

Before I begin to deal with the second mission in **Elite**, you might like to ponder the following use of tactics. On completing the first mission at Orrarra in Galaxy Two, I looked for my favourite planetary configuration – a poor agricultural feudal system near a rich industrial corporate state or democracy. The search via the long range chart revealed Biabete, the feudal one, and Vezaees. So I quickly made my way there, trading as I went.

What I do is this: Buy a full load of computers at Vezaees then do a straightforward trading run to Biabete, destroying any attacking ships I encounter on the way. Once there, I stock up with a maximum of 20 tons of furs and go bounty hunting outside the safe area of Biabete.

With only 20 tons in your hold, you can scoop up another 15 tons of cargo from the ships you destroy before needing to leave the system. If the

Turn to Page 110 ▶

◀ *From Page 109*

furs you are carrying are destroyed in combat, at least you will have kept the financial loss to something more or less acceptable.

Attacks can be relatively few to begin with, so keep using the jump button to trigger the arrival of other ships. Take every opportunity to blast asteroids, since they count towards your score, but do keep a good look out for innocent traders. These innocents normally appear in the same way that asteroids do, suddenly registering on your radar screen at maximum laser range. Avoid them at all costs unless you enjoy having Fugitive status. I find it a bore needing to destroy all those police Vipers – and it has a considerable effect by delaying your return to squeaky-clean innocence.

An innocent ship will usually be a Python or Cobra MkIII, but occasionally a Fer de Lance turns out to be innocent too. As a rule of thumb I'd recommend the following: If a ship appears and then attempts to flee when you try to head for it, let it go. It's innocent and is frantically running for the planet you have recently left, so if you fly in the opposite direction your condition will very soon revert from yellow to green.

The moment my ship is damaged when I am in the Biabete system, I start to think of heading for Vezaees. I hit the hyperspace button at once if I lose my fuel scoops, otherwise I might stay until I have lost two items of equipment. On the other hand, if I suffer damage in the trading journey towards Biabete I think seriously about cancelling the bounty hunt and making instead a pure trading run back to Vezaees.

The overall aim is straightforward enough – maximise your score while trading profitably and do everything you can to minimise your losses. As each *Right on Commander* accolade approaches the pressure increases and you may need to exercise judicious use of the energy bomb option so as not to waste time. Don't be greedy when bounty hunting – 30 or 40 kills are quite enough before hyperspacing to Vezaees.

Deadly status is awarded after you have achieved a total of eight *Right on Commander* messages; at the time of writing my own total is 16, which means the second mission is not too far away.

I have to report – and I'm intensely frustrated on your behalf – my BBC B power supply needs attention, so until it is fixed I can't proceed further. How do I know? Well, I used my borrowed Master-plus-Second Processor equipment to see what happened. Result: I am Elite for the umpteenth time, but the second mission was not triggered – there has to be a crucial status flag involved here.

Fortunately, I did save my position before I needed to use the new hardware configuration, so be patient, persevere and until next month, happy adventuring.

ACORN AT SOLIDISK
RING 0702 354 674
17 Sweyne Avenue, Southend-on-Sea, Essex SS2 6JQ

All prices include VAT.
Post & packing: Please allow £2 on small items and £10 on large items.

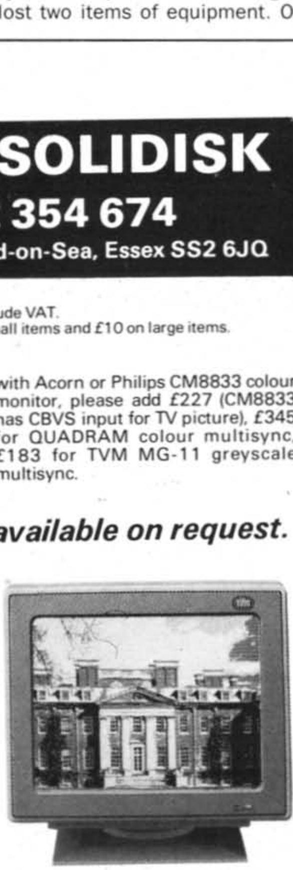
A305 .... £725
A310 .... £860
A310M £923
A440 .... £2599

with Acorn or Philips CM8833 colour monitor, please add £227 (CM8833 has CBVS input for TV picture), £345 for QUADRAM colour multisync, £183 for TVM MG-11 greyscale multisync.

Full Acorn price list is available on request.

BBC Upgrades

1772 double-density disc interface £35.00
1772/8271 DFDC (requires Acorn 8271) £45.00
Solidisk DFS 2.2 ROM £10.00
Solidisk ADFS+DFS two-ROM set £20.00
40/80 track switchable double-sided drive £119.00
Twin 40/80 track drives in a bridge £338.00



MG-11

The Multi-function Twomeg 128K

This new style TWOMEG 128K board is the best ever solution for memory upgrades. It combines a ROM expansion, a Sideways RAM and a Shadow RAM on a single board, offering:
- 8 ROM sockets (4 on the TWOMEG board, 4 on the BBC motherboard).
- 8 Sideways RAM banks (4-7, C-F).
- can be fitted with only 64K RAM (banks C-F).
- 4 of the RAM banks (4-7) can be used as a RAM disk with Solidisk DFS or ADFS.
- 2 of the RAM banks (C-D) can be used as a Shadow RAM and a small (8K) Sideways.
- any bank can be used as a printer buffer.
- Write Protect switch for Sideways software.
- in the included software: MENU, MANAGER, Printer Buffer.

Easy installation: simply remove the 6502, drop in the board and push three wires onto the middle pins of S20, S21 and S22.
ABSOLUTELY NO CUTTING, NO CLIPS, OR SOLDERING.

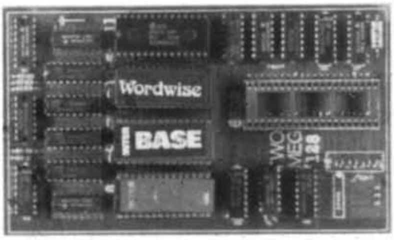
TWOMEG 128K FROM £55

with 64K of RAM £55

with 128K of RAM £70

2×4464's RAM chips £15

Prices include VAT and software disc. Please add £2 for post and packing.



TELETEXT

£89.95

Mains powered, can display TV picture and sound on Philips monitors.
Free ATS ROM image and manual for all BBC's.

SPECIAL OFFERS ON ATARI COMPUTERS
Limited stocks and they move fast!

ComputeCh

INTEGRA-β

The Expansion for the BBC Model B

Includes
64k Sideways Ram,
12k Private Ram,
20k Shadow Ram,
Real-Time Clock,
8 free Rom sockets - will take 128k Ram.

What the press have said -

A&B Computing · Clive Grace
"I *like* this board – buy it!"
ACORN USER · Dave Futcher
"an outstanding product"

The INTEGRA-β provides four operation modes - as standard Beeb or with shadow Ram and emulation of 'B+' or of Master 128. Ideal for educational, commercial and data collection applications, as well as the private user.

The included battery-backup system, (which covers all fitted Ram), can save any data in Ram during a power-line disturbance or when the computer is switched off. Also, Rom images can be loaded from disc, stored and cleared at will, minimising the need for physical Rom changes. Compatible with DFS, ADFS and second processors conforming to ACORN® protocols.

OFFER PRICES

UK - £130 (incl. P&P, VAT), Europe - £118 (incl. P&P), Others - £118 plus P&P.
Extra 32k RAM Chip - £14 - (incl. P&P UK & Europe)
Dual WP Switch Assembly - £7, Extra Way - £1.50, (incl. P&P UK & Europe)

COMPUTECH
The Garth, Hampsfell Road, Grange over Sands, Cumbria.
LA11 6BG. Telephone: 044 84 4604

How to get your BBC Micro to talk to an Amstrad

(or a Spectrum or a Commodore or an Atari or an IBM . . . or ANY other computer).

Language problems become a thing of the past when you join MicroLink. Now you can use your BBC Micro (plus your telephone) to send messages to any other computer user, with no restriction on make of machine – or even on distance.

MicroLink *electronic mail and much, much more!*

Details from 0625 878888

THE MICRO USER MAIL ORDER OFFERS **THE MICRO USER MAIL ORDER OFFERS**

Two indispensible companions for your BBC Micro

The Complete BBC Computer User Handbook

ONLY
£14.95

This book has over 300 pages packed with hints, tips and example programs on subjects ranging from hardware additions and networks, through programming style and speeding up your programs, to debugging procedures, computers in the office and selling your own programs.

Every conceiveable aspect of using your BBC Micro is covered in this book, in a friendly, readable style. Includes a detailed 24 page index.

This top-selling book is designed to plug the gap between beginner and expert – which it does admirably.

The Complete BBC Computer User HANDBOOK
ADVANCED REFERENCE MANUAL for the BBC MASTER

The Advanced Reference Manual for the BBC Master

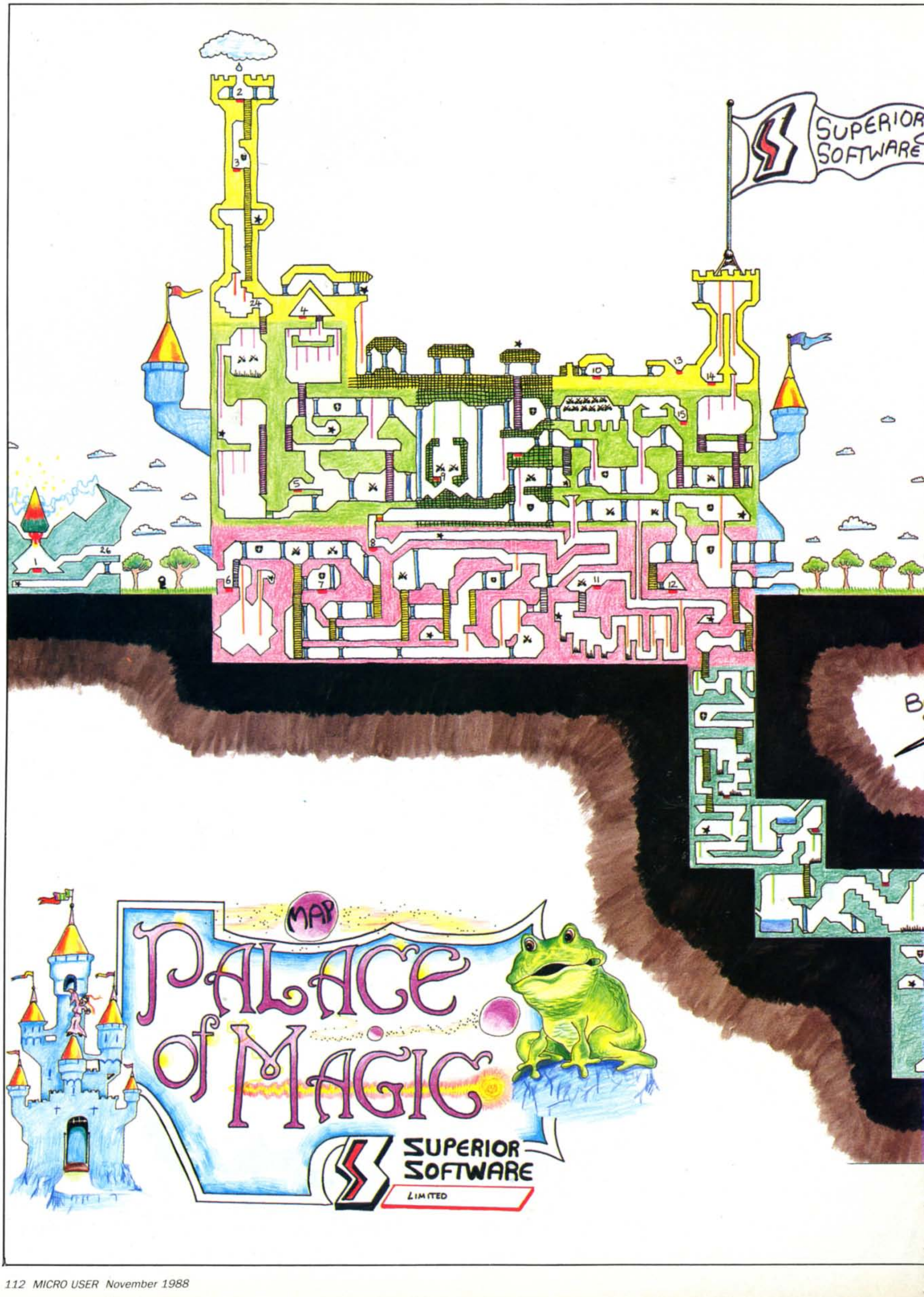
ONLY
£16.95

This is the definitive guide to the BBC Master and takes off where the first Advanced User Guide left off. No matter what you need to know, from basic architecture and the circuit board to memory organisation, second processors, disc filing systems and application software, it's all in this book.

Within its 300 pages you'll find all the reference material you need for hardware and software design.

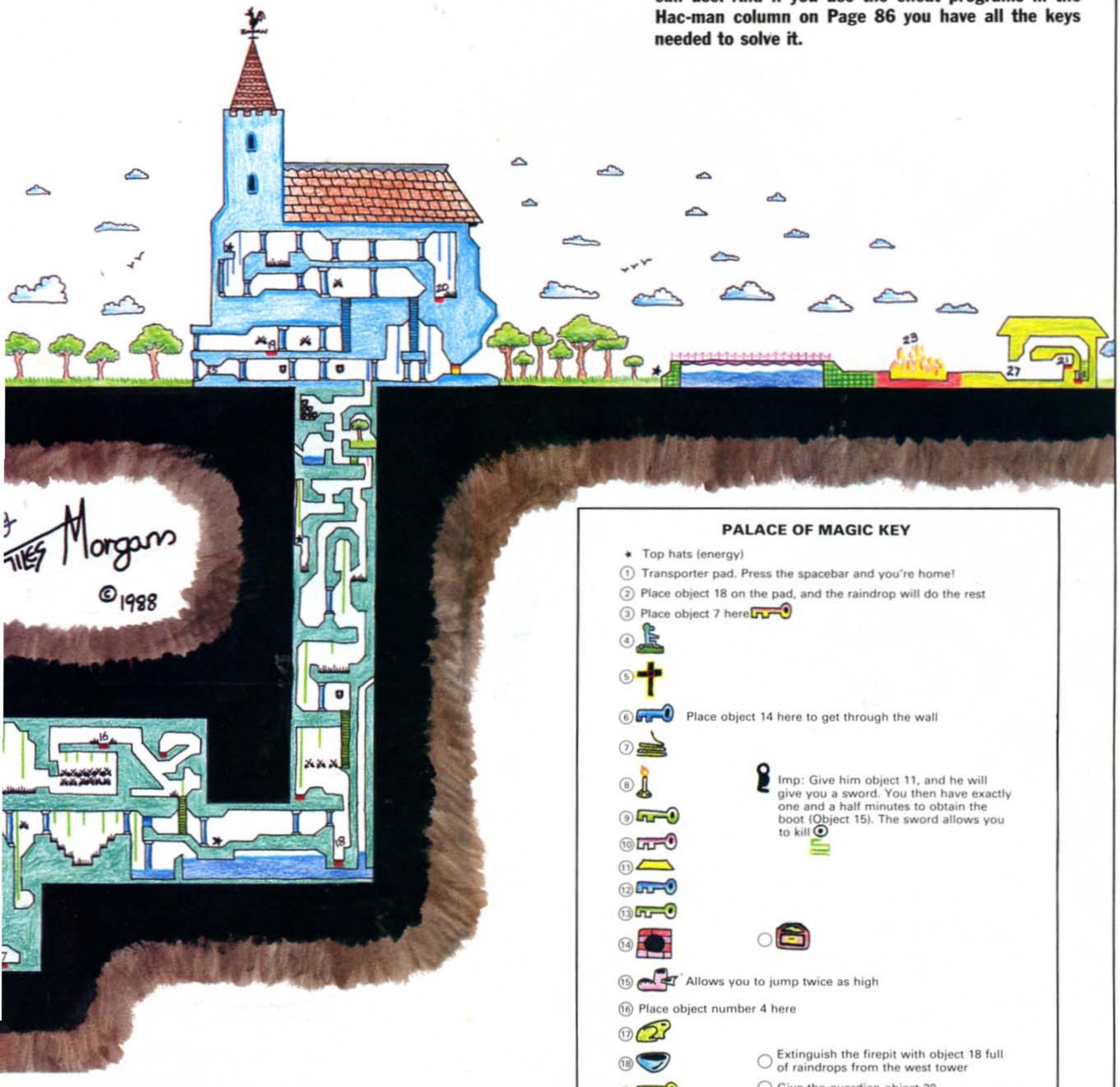
Written by leading authorities on the BBC Micro, this reference manual is the most comprehensive source of information for the BBC Master.

TO ORDER, PLEASE USE THE FORM ON PAGE 135


SUPERIOR SOFTWARE
MAP
PALACE of MAGIC
SUPERIOR SOFTWARE
LIMITED
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
24
26

THE MICRO USER

Lots of people have asked for help with Palace of Magic from Superior Software. So here's the complete map of the game, plus the key to all the objects you can use. And if you use the cheat programs in the Hac-man column on Page 86 you have all the keys needed to solve it.



PALACE OF MAGIC KEY

- * Top hats (energy)

① Transporter pad. Press the spacebar and you're home!
② Place object 18 on the pad, and the raindrop will do the rest
③ Place object 7 here
④
⑤
⑥ Place object 14 here to get through the wall
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭ ○
⑮ Allows you to jump twice as high
⑯ Place object number 4 here
⑰
⑱
⑲
⑳
㉑

Imp: Give him object 11, and he will give you a sword. You then have exactly one and a half minutes to obtain the boot (Object 15). The sword allows you to kill

○ Extinguish the firepit with object 18 full of raindrops from the west tower
○ Give the guardian object 20
○ Give the vicar object 5
○ Give this guardian object 22
○ Give the evil princess object 17

THE MICRO USER MAIL ORDER OFFERS

NEW! TEN of the BEST! EDUCATIONAL GAMES

Crocodile Tears
HUNGRY HARRY
PR.T.ER
Dozer Disorder
summer
Company Count
4×9=
ODD ONE OUT
Yule Spell

Packed full of some of the best educational games available for the BBC Micro, the new Ten of the Best Educational Games is the ideal way for your children to learn about maths, spelling, anagrams, telling the time, general knowledge, and even the rudiments of running a business!

Specially compiled by the *Electron* and *Micro User*, teams to give a good ground in all aspects of learning, and at the very special price of only £5.95 on tape, or £6.95 on disc, this collection is a treat you and your children cannot afford to miss!

Give your children hours of fun, and help them to learn the easy way by ordering your copy today.

THE PROGRAMS

Company Count – Work your way up through the company starting off as a messenger, and ending up as president!

Hungry Harry – Find out what it's like to be an assistant in a busy shop. Can you work out the correct change to give the customers?

Lemonade Stall – Try your hand at running a lemonade stall at a popular seaside resort.

Dozer Disorder – Fill in the missing letters after they are bulldozed into a pit.

Crocodile – Unscramble the letters of a word before the crocodile gets you.

Snail Trail – See how good you are at general knowledge in this trivia quiz.

Hiss – Improve your spelling by guiding a snake round the garden eating up words in the right letter order.

Maths Fun – Test your powers of mental arithmetic.

Odd One Out – Pick the object that doesn't fit from the list of five.

Yule Spell – Guess the hidden word or you'll lose your Christmas presents!

Tape	Disc
£5.95	£6.95

Order your copy today, using the form on Page 135

COLOURJET 132

HIGH PERFORMANCE COLOUR INK JET PRINTER

(compatible with IBM pc, BBC micro, Nimbus etc.)

- ★ PRINTS ALL 64 SCREEN COLOURS FROM CGA AND EGA USING OPTIONAL INTEGREX SOFTWARE
- ★ EMULATES OTHER PRINTERS (A1210, PJ1080A and QUADJET)
- ★ OVERHEAD TRANSPARENCY PRINTING
- ★ 80 + 132 COLUMN OPERATION, A4 WIDTH
- ★ UP TO 1280 DOTS/LINE ADDRESSABLE
- ★ FULL VIDEOTEX CAPABILITY
- ★ OPTIONAL BUFFERED RS232 (INTERNAL)
- ★ HIGHLY VERSATILE

SALES
BY DIVISION
CHEMICALS
TELECOMM
100
80
60
40
20
0
J
F
M
A
INTEGREX COLOURJET 132
FF
LF
ON LINE
ON LINE
ALARM
READY

**ULTRA
LOW
NOISE**

**LIST PRICE
£589 + VAT**

EDUCATIONAL DISCOUNTS AVAILABLE

INTEGREX LTD CHURCH GRESLEY, BURTON ON TRENT
STAFFS DE11 9PT
Tel (0283) 215432
Telex 341727 INTEGX

TWILLSTAR COMPUTERS LTD

ARCHIMEDES

305 BASE AKB10	**612.00**
305 & mono monitor	**665.00**
305 & colour monitor	**827.00**
310 BASE AKB15	**731.00**
310 & mono monitor	**783.00**
310 & colour monitor	**922.00**
A310M AKB30	**783.00**
A310M mono	**835.00**
A310M colour	**975.00**
410 SERIES	
Mono	**P.O.R.**
Colour	**P.O.R.**
440 SERIES	
Entry System	**2210.00**
Mono	**2263.00**
Colour	**2403.00**
Archimedes/Master Econet	**43.00**
0.5 MB RAM	**127.00**
Floppy disk	**110.00**
20 Mbyte hard disk & podule (300 only)	**423.00**
Podule Backplane	**35.00**
Archimedes Pref. Manual	**29.95**
Assm. Lang Prog Manual	**11.00**

Archmedes software in stock

MASTER 128

Complete with internal Software	**346.00**
Master Turbo Upgrade	**99.00**
Master Econet Module	**40.00**
Master 512 Upgrade	**99.00**
Universal second processor	**75.00**
Eprom Cartridge	**13.00**
Reference Manual Part 1	**14.95**
Reference Manual Part 2	**14.95**

BBC MASTER COMPACT

ENTRY SYSTEM *128k* *Single 640K Drive* *Bundled Software*	**306.00**
TV SYSTEM *128K* *Single 640K Drive* *UHF Modulator* *Bundled Software*	**319.00**
MONO SYSTEM *128K* *Single 640K Drive* *Bundled Software* *12" High Res Monochrome Monitor*	**349.00**
COLOUR SYSTEM *128K* *Single 640K Drive* *Bundled Software* *14" Medium Res Colour Monitor*	**481.00**

MONITORS

Phillips BM 7502 12" Hi res. P31 Green Phospher Screen. CVBS input. Audio input Band width 20 MHz. 2000 CHRS Display	**68.00**
Samsung 12" Mono White	**89.00**
Samsung 12" Mono Green	**89.00**
Samsung 12" Mono Amber	**97.00**
Samsung 14" Mono Hi Res White	**97.00**
Samsung 14" Mono Hi Res Green	**97.00**
Samsung 14" Mono Hi Res Amber	**109.00**
Samsung 14" CGA	**249.00**
Samsung 14" CGA/EGA	**335.00**
Samsung 14" VGA	**335.00**
Samsung 14" Multiscan	**355.00**

COLOUR MONITORS

Phillips CM8833 14"CVBS and RGB medium resolution colour monitor. IBM PC compatible. Fast blankup to enable superimposing. Stereo Audio. Ear phone socket. 600 dots x 285 lines vertical	**234.00**
Phillips CM8852 14" RGB professional med res colour. 700 dots x 285	**251.00**

SERIAL & PARALLEL T SWITCHES

Parallel T switch (2 way)	**20.00**
Parallel T Switch (4 way)	**25.00**

MITSUBISHI DISC DRIVES

Source 100% BBC compatible slimline disk drives. All drives supplied complete with formatting diskette, comprehensive users manual and all necessary cables. All drives are 40/80 switchable and have two years warranty.

5¼" Drives without P.S.U.	
400A Single 400K Double Sided	**98.00**
SD 802C Dual 400K Double Sided	**190.00**
5¼" Drives with P.S.U.	
400B Single 400K Double Sided	**117.00**
SD 802E Dual 400K Double Sided	**204.00**
SD 802D Dual 400K Drives horizontally mounted in a monitor stand to fit both the BBC B and the Master series	**230.00**
Mitsubishi Bave drives uncased with 40/80 switch	**77.00**

WINCHESTER DISC DRIVES

20 Mbyte	408.00
30 Mbyte	432.00
40 Mbyte	552.00
60 Mbyte	672.00

All Winchester come ready to plug into the Master 128.

ADFS RAM required for BBC	**26.00**

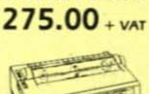
PANASONIC KX-P 1081

Panasonic KX-P1081. .... **135.00**

The faster and enhanced KX-P1081. 120 cps in draft mode. 24 cps in NLQ mode. Fully Epson RX80 and IBM Matrix and Graphics Printers compatible. Standard friction and tractor feed. Operator accessible print mode switch. Standard 8 bit parallel interface. RS232 interface is optional.

NEC P2200 PINWRITER

275.00 + VAT



FREE PRINTER CABLE
FREE PRINTER STAND
FREE 200 SHEETS PAPER

24-pin dot – matrix printer. Letter-perfect print, in several sizes, at 56 characters per seconds (cps). Or switches to draft mode for high-volume outputs at 168 cps. Built-in tractor that permits push or pull feeding.

Print Rate: High-speed draft: 168 cps. Standard draft: 140cps. Letter quality: 56 cps
Printhead: Impact, 24-pin dot matrix.
Input Buffer: 8K standard
Graphic Resolution: Up to 360 x 360 dpi

CUT SHEET FEEDER	**59.00**
SERIAL INTERFACE KIT	**55.00**
FRONT CARTRIDGE	**25.00**

NEC MONITORS

OFFICIAL NEC UK PRODUCTS

MULTISYNC PLUS **695.00**
This 15 inch, high resolution (1024 x 768) monitor is ideal for use with IBM/XT/AT and PS/2 plus Apple Mac II and othe IBM PC compatible microcomputers. It automatically scans all horizontal frequencies from 21.8 KHz to 48 KHz and vertical frequencies ranging from 50 to 90 HZ. It supports EGA, enhanced EGA, PGC, MCGA, and VGA colour graphics standards.

MULTISYNC II **450.00**
This redesigned 14" MultiSync high resolution monitor offers all the benefits of the previous model such as automatic synchronisation, suitable for use with IBM/XT/AT and PS2 plus Apple Mac II and compatible with Hercules, MDA, CGA, EGA, EGA+, PGC, and VGA graphics standards plus front mounted user controls and automatic selection of Analog/TTL and Vertical Hold modes.

MULTISYNC GS **149.00**
Offers the user a high resolution (720 x 480), 14 inch monochrome display which is hardware compatible with IBM PC, XT, AT, and PS/2 machines. The MultiSync GS supports MDA, Hercules, CGA, EGA, MCGA and VGA display standards. It automatically locks on to one of five frequencies from 15.7 to 31.5 KHz to suppport all the above major graphics standards and three vertical frequencies ranging from 50 to 70 HZ.

PC ADD ONS

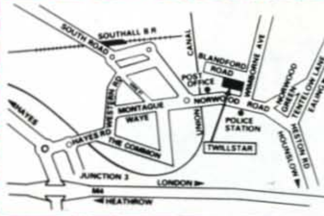
20 Mb Hard Disk	**199.00**
30 Mb Hard Disk	**240.00**
20 Mb Hard Card	**199.00**
30 Mb Hard Card	**240.00**

Other PC products available.
Call for details.

SPECIAL PACKAGE
Phillips CM8833 Monitor and TV Tuner **249.00**

Save £45.

Maintenance contracts available.
Authorised service centre.
Call for details 01-574 5271



APEX HOUSE
BLANDFORD ROAD
NORWOOD GREEN
SOUTHALL
MIDD UB2 4HD
☎ 01-574 5271 or
☎ 01-571 5938
Telex: 25247 Telex G.attn TIL
Fax: 01-574 4326

You can purchase any of the items listed. All you have to do is write your requirements on a sheet of paper, and we will despatch your goods within 24 hours, subject to availability. Please add the following amounts for Postage and Packing.

Items below 10.00	*add* ***1.50***	*Items below 50.00*	*add* ***2.50***
Items below 100.00	*add* ***3.50***	*Items over 100.00*	*add* ***8.00***

(UK Mainland only)
All prices exclude VAT. Please add 15% VAT to all orders.
Prices correct at time of going to press but subject to change without notice.
Please make cheques payable to: ***TWILLSTAR COMPUTERS LTD.***
Access/Visa Card Holders: Welcome.
VISIT OUR MEGA-COMPUSTORE OPEN 9am – 6pm Monday to Saturday
CREDIT FACILITIES, we are authorised credit brokers, Typical APR 36%

PRINTERS

AMSTRAD LQ3500 .... **250.00**
24 pin NLQ 160cps. LQ 54CPS. Prints graphics output. Supplied with bolt-on tractor and featuring PC and Epson LQ-1500 compatibility.
(Subject to availability)

AMSTRAD DMP4000 .... **250.00**
200cps wide-carriage. Inbuilt tractors allow fast paper slew rates, and PC and Epson FX compatibility.
(Subject to availability)

NEW PRINTERS

AMSTRAD DMP3250 di	**189.00**
AMSTRAD LQ3500 di	**299.00**
AMSTRAD LQ5000 di	**369.00**

STAR LC-10 .... 189.00
New enhanced version complete with IBM & Parallel Interface

Sheetfeeder	**POA**
STAR LC-10 Colour	**215.00**
Ribbon	**4.70**

MP135
135 cps, 80 column printer. Friction tractor feed. NLQ. Epson & IBM Compatible **126.00**

EPSON PRINTERS

LX-800	**199.00**
FX-800	**320.00**
FX-1000	**399.00**
EX-800	**420.00**
EX-1000	**565.00**
LQ-500	**299.00**
LQ-850	**449.00**
LQ-1050	**599.00**
LQ-2500+	**720.00**
LQ-2550	**899.00**
SQ-2500	**969.00**
SQ-3500	**1199.00**

NEC PINWRITER P9XL

P960XL	**885.00**
P965XL Serial/Parallel	**970.00**

NEC SILENTWRITER LC866+/LC890

LC866+	**1870.00**
LC890	**2995.00**

FREE with Silentwriter 12 months onsite maintenance contrac.

NEC PINWRITER P5XL

P565XL Serial/Parallel	**740.00**
Pin tractor	**50.00**
Bi-directional tractor	**125.00**
Single bin cut sheet feeder	**240.00**
Double bin cut sheet feeder	**440.00**
Font cartridge	**40.00**
RAM cartridge	**30.00**

NEW NEC PINWRITER P6/P7

The ultimate matrix printer for business. Prin speeds of 265cps in draft and 90cps in letter quality. Inbuilt tractors. A paper park and low tear off facility. Twenty inbuilt fonts as standard. A font cartridge facility for greater flexibility. An amazing 80K byte print bufer. 24 pin printhead. Centronics parallel interface. Compatible with previous NEC 24 pin printers.

P6+ 80 characters	**434.00**
P7+ 136 characters	**608.00**

DAISYWHEELS

BROTHER HR 20
Daisywheel 8K standard buffer upgradable to 16K. Standard serial/parallel port **338.00**

JUKI Daisywheel
Juki 6100 .... **286.00**

GAKKEN GPR-2000
Print speed of 18 characters per second. Fully Qume compatible. Takes Qume exchangable Daisywheel and ribbons. Selectable 10, 12 & 15 pitch. Supports proportional spacing. Standard friction feed. Tractor/cut sheet feeder and serial interface optional. **146.00**

CITIZEN Daisywheel
Premiere 35
35cps 15" daisywheel. Diablo compatible **399.00**

PRINTERS
SPECIAL OFFER OF THE MONTH

CITIZEN 120D ***117.00***
Dat Matrix Printer. 120cps NLQ. 2 year warranty. You have to see the quality at this price.

CITIZEN LSP 100P **138.00**
120/25cps 80 column Centronics IBM Parallel

CITIZEN MSP 15E
160/40cps 136 column Centronics IBM Parallel **240.00**

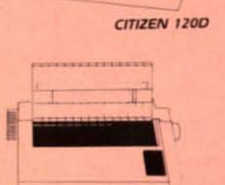
CITIZEN HQ P40 .... **325.00**
80 column. 24 pin. Dual interface.

Colour Option	**50.00**
Colour Ribbon	**20.00**

CITIZEN HQ P45 .... **289.00**
136 column. 24 pin. Dual interface.

PRINTERS

CITIZEN 120D



CITIZEN HQ P40

B B+ M

SPACE ESCAPE

Can you recover the blueprints in Ali Harwood's fast action adventure?

SUPREME command has given you – drone unit Z19 – the perilous mission of recovering and returning the stolen blueprints of Earth's defence system. They are in the form of eight files – shown on the screen as BP – and previous agents who failed have reported back that they are scattered all over a far off space complex. As you start your mission you are teleported into the complex and on your travels you will find keys which in turn open padlocks.

You can then explore further, but watch out for the deadly space flies which will kill you upon impact. Fortunately, as you are an extremely advanced drone you have three life systems, and a new one turns on automatically when you are killed.

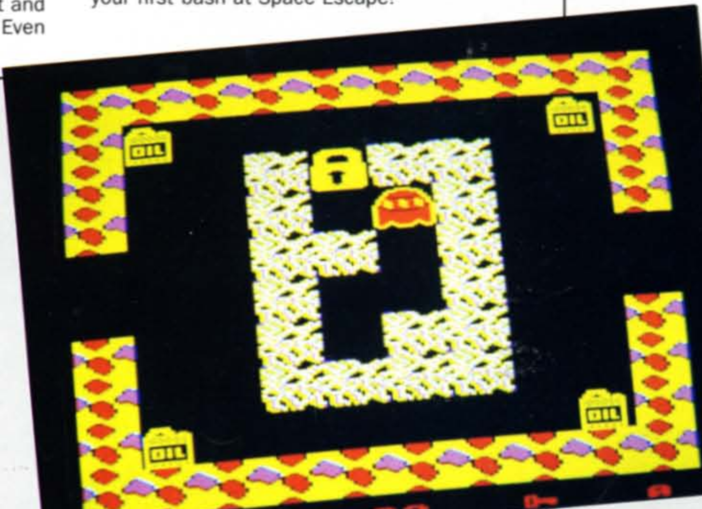
Like any good drone you lap up all the oil you can get, but keep away from the spikes – they create havoc with your paint job. Transporters are a welcome sight – they give your feet a rest and show you a brand new piece of the complex. Even more so if it is the homing transporter which will send you back to Earth.

The listing should be typed in and checked for typing errors using Get it right! It is vital that you save the program before running as some initialisation lines are deleted when it is run – using the method described in the Febuary 1988 Letters. Before loading the game you must set Page to &2000 by typing:

```
PAGE=&2000
```

The keys you use are displayed on the title page and if you're lucky enough you may even hit the big time and get your first score on to the high score table. That's not too difficult because the bottom score is zero – but it sounds quite flashy.

So it's time to give your typing fingers a rest, get your adrenalin in gear and hit the spacebar for your first bash at Space Escape!



```
   10 GOTO1780
   20 REM       SPACE ESCAPE
   30 REM      By Ali Harwood
   40 REM   (c) The Micro User
   50 REM  --------------------
   60 MODE5:VDU23,1,0;0;0;0;
   70 HIMEM=HIMEM-&1000
   80 PROCinit
   90 REPEAT
  100 PROCtitle
  110 PROCgame
  120 UNTIL0
  130 DEFPROCinit
  140 *fx4,2
  150 *fx15
  160 *fx229,1
  170 FORA=0TO&D00STEP4:A!HIMEM=A!&1250:
NEXT
  180 DIMscore(7),name$(7),xalien%(9),ya
lien%(9),line%20
  190 FORA=0TO7:READname$(A),score(A):NE
XT
  200 map%=&1250:sprite%=&900
  210 ENDPROC
  220 DATAAli Harwood,2700,Ravin' mad,20
00,Pal !!,1750,Thanks to,1500,Terry Blun
t,1250,His routine,1000,From Feb 88,500,
Is used,0
  230 DEFPROCdouble(dx,dy,dm$)
  240 VDU31,dx,dy:FORd=1TOLENdm$:?&70=AS
CMID$(dm$,d,1):A%=&A:X%=&70:Y%=0:CALL&FF
F1
  250 VDU23,159,?&71,?&71,?&72,?&72,?&73
,?&73,?&74,?&74,159,10,8,23,159,?&75,?&7
5,?&76,?&76,?&77,?&77,?&78,?&78,159,11
  260 NEXT:ENDPROC
  270 DEFPROCtitle
  280 FORA=1TO3:VDU19,A,0;0;:NEXT:CLS:CO
LOUR2:PROCdouble(4,3,"SPACE ESCAPE"):COL
OUR1:PRINTTAB(3,7)"By Ali Harwood"TAB(3,
10)"(c) Micro User":COLOUR3
  290 PRINTTAB(0,15)"Z/X"SPC7"left/right
"'"*/?"SPC10"up/down"'"RETURN"SPC9"pause
"'"ESCAPE"SPC10"quit"'"S/D"SPC5"sound on
/off"
  300 COLOUR1:PRINTTAB(4,30)"Press  SPAC
E":VDU19,1,2;0;19,2,3;0;19,3,6;0;:*fx15
  310 IFINKEY400=32CLS:ENDPROC
  320 CLS:FORA=1TO3:VDU19,A,0;0;:NEXT:PR
OCdouble(4,3,"High  Scores"):PRINT''
  330 FORA=1TO8:COLOUR1:PRINT';A;". ";:C
OLOUR2:PRINTname$(A-1);:COLOUR3:PRINTTAB
(20-LENSTR$score(A-1));score(A-1):NEXT
  340 COLOUR1:VDU19,1,2;0;19,2,3;0;19,3,
6;0;:*fx15
  350 IFINKEY400:GOTO280
  360 DEFPROCgame
  370 PROCsetup
  380 REPEAT
  390 IFdisplay%PROCdisplay
  400 IFandroid%PROCandroid
  410 PROCstatus
  420 PROCkeys
  430 IFalien%PROCmovealiens
  440 IFhome%PROChome
  450 UNTILdeath%
  460 PROChighscore
  470 ENDPROC
  480 DEFPROCsetup
```

Turn to Page 119 ▶

WIN
this solid silver Grail, worth £5,000, in the exciting Quest for the Holy Grail competition. Full details in every box.

Travel back to the Age of Chivalry when knights were bold, galloping across the countryside and rescuing damsels in distress.

Level 9 recreate the time of wizards and the Knights of the Round Table in their greatest adventure yet. Lancelot consists of three interlinked adventures, spanning the complete saga from the foundation of the Order to its finest hour – the quest for the Holy Grail.

Guide Lancelot through his many exploits at Camelot, battle with wayward knights, and win the love of Guinever and Elaine.

The challenge which has fascinated treasure hunters through the centuries is now yours – and you'll need all your strength, wit and valour to achieve your goal.

Inside every box there's a detailed guide to playing Level 9 adventures, a background story to the classic legend, a parchment map of Arthurian England – and full details of how to take part in the Quest for the Holy Grail competition.

Screen shots from Atari ST version

MANDARIN SOFTWARE

Level 9

Format	Tape	Disc	Price
Atari ST		●	£19.95
Amiga		●	£19.95
Amstrad PC, IBM PC and compatibles		●	£19.95
Amstrad CPC/PCW/ Spectrum Plus 3		●	£19.95
Commodore 64	●	●	£14.95
Spectrum	●		£14.95
Amstrad CPC	●		£14.95
*Atari XL/XE	●	●	£14.95
BBC Master		●	£14.95
*Apple II		●	£14.95
Macintosh		●	£19.95
MSX 64K	●		£14.95

**These formats and all tape versions are text only.*

Note: Tape versions have three cassettes in every package

Please send me Lancelot on ☐ cassette ☐ disc
for: ______________________ (state machine)
☐ I enclose a cheque for £_____ (including VAT and p&p)
made payable to Mandarin Software
☐ Please debit my Access/Visa number: *Expiry date:* ☐ / ☐
☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signature ______________________

Name ______________________

Address ______________________

____

______________________ *Postcode* ______________________

Send to: Mandarin Software, Europa House,
Adlington Park, Adlington, Macclesfield SK10 4NP.

Enquiries: 0625 879940 Order Hotline: 0625 879920 R210

◀ From Page 117

```
  490 FORA=0TO&D00STEP4:A!&1250=A!HIMEM:NEXT
  500 xpos%=12:ypos%=120:xpos0%=12:ypos0%=120:xand%=3:yand%=5:prints%=0:mappos%=0:death%=0:display%=1:android%=0:score%=0:lives%=3:key%=0:home%=0
  510 ENDPROC
  520 DEFPROCdisplay
  530 alien%=0:FORA=1TO3:VDU19,A,0;0;:NEXT:CLS:display%=0:FORx=0TO9:FORy=0TO9:A%=?(map%+mappos%+y+x*10)-65:IFA%=-19GOTO560
  540 X%=x*4:Y%=y*24:IFA%=1xalien%(alien%)=x:yalien%(alien%)=y:alien%=alien%+1
  550 CALLsprite%
  560 NEXT,:X%=xpos%:Y%=ypos%:A%=0:CALLsprite%:VDU19,1,1;0;19,2,3;0;19,3,5;0;
  570 ENDPROC
  580 DEFPROCstatus
  590 COLOUR1:VDU31,14,31:IFkey%VDU129ELSEVDU32
  600 PRINTTAB(1,31)STRING$(5-LENSTR$score%,"0");score%TAB(9,31)STRING$(2-LENSTR$lives%,"0");lives%TAB(18,31);prints%;
  610 ENDPROC
  620 DEFPROCkeys
  630 IFINKEY-82:*fx210
  640 IFINKEY-51:*fx210,1
  650 IFINKEY-113death%=1:ENDPROC
  660 IFINKEY-73PROCup:ENDPROC
  670 IFINKEY-105PROCdown:ENDPROC
  680 IFINKEY-98PROCleft:ENDPROC
  690 IFINKEY-67PROCright:ENDPROC
  700 IFINKEY-74PROCpause
  710 no%=no%+1:IFno%>100:energy%=energy%+1:no%=0
  720 ENDPROC
  730 DEFPROCpause
  740 CLS:PRINTTAB(0,5)"SCORE:"''"LIVES:"''"BLUE"''"PRINTS:":COLOUR2:PRINTTAB(8,5)STRING$(5-LENSTR$score%,"0");score%TAB(8,7)STRING$(2-LENSTR$lives%,"0");lives%TAB(8,11)prints%
  750 COLOUR3:PRINTTAB(0,20)"Press SPACE."
  760 REPEATIFINKEY-2ANDINKEY-66ANDINKEY-87ANDINKEY-38lives%=99:COLOUR2:PRINTTAB(8,7)"99"
  770 UNTILINKEY-99:CLS:display%=1
  780 ENDPROC
  790 DEFPROCleft
  800 IFxand%=0ANDyand%<>4ANDyand%<>5ENDPROC
  810 IF(yand%=4ORyand%=5)ANDxand%=0PROCleftnew:ENDPROC
  820 IFFNcheck(-1,0):ENDPROC
  830 xand%=xand%-1:xpos%=xpos%-4:android%=1
  840 ENDPROC
  850 DEFPROCright
  860 IFxand%=9ANDyand%<>4ANDyand%<>5ENDPROC
  870 IF(yand%=4ORyand%=5)ANDxand%=9PROCrightnew:ENDPROC
  880 IFFNcheck(1,0):ENDPROC
  890 xand%=xand%+1:xpos%=xpos%+4:android%=1
  900 ENDPROC
  910 DEFPROCup
  920 IFyand%=0ANDxand%<>4ANDxand%<>5ENDPROC
  930 IF(xand%=4ORxand%=5)ANDyand%=0PROCupnew:ENDPROC
  940 IFFNcheck(0,-1):ENDPROC
  950 yand%=yand%-1:ypos%=ypos%-24:android%=1
  960 ENDPROC
  970 DEFPROCdown
  980 IFyand%=9ANDxand%<>4ANDxand%<>5ENDPROC
  990 IF(xand%=4ORxand%=5)ANDyand%=9PROCdownnew:ENDPROC
 1000 IFFNcheck(0,1):ENDPROC
 1010 yand%=yand%+1:ypos%=ypos%+24:android%=1
 1020 ENDPROC
 1030 DEFPROCandroid
 1040 android%=0:X%=xpos0%:Y%=ypos0%:A%=0:CALLsprite%:X%=xpos%:Y%=ypos%:CALLsprite%:xpos0%=xpos%:ypos0%=ypos%
 1050 ENDPROC
 1060 DEFPROCdelete(dx,dy)
 1070 X%=dx*4:Y%=dy*24:A%=?(map%+mappos%+dy+dx*10)-65:IFA%=-19ENDPROC
 1080 CALLsprite%:?(map%+mappos%+dy+dx*10)=46
 1090 ENDPROC
 1100 DEFFNcheck(x,y)
 1110 x=x+xand%:y=y+yand%:A$=CHR$?(map%+mappos%+y+x*10)
 1120 IFA$="C"=1
 1130 IFA$="D"=1
 1140 IFA$="E"=FNspikes
 1150 IFA$="F"=FNkey
 1160 IFA$="G"=FNpadlock
 1170 IFA$="I"=FNoil
 1180 IFA$="J"=FNtransporter
 1190 IFA$="K"=FNprints
 1200 =0
 1210 DEFFNspikes:PROClooselife:=1
 1220 DEFFNkey:IFkey%:=1
 1230 PROCdelete(x,y):score%=score%+5:FORS=-10TO0:SOUND1,S,30,1:NEXT:key%=1:=0
 1240 DEFFNpadlock:IFkey%=0:=1
 1250 PROCdelete(x,y):score%=score%+15:FORS=-10TO0:SOUND1,S,100,1:NEXT:key%=0:=0
 1260 DEFFNoil:PROCdelete(x,y):score%=score%+10:FORS=-15TO-10:SOUND1,S,100,1:NEXT:=0
 1270 PROCdelete(x,y):score%=score%+10:FORS=-15TO-10:SOUND1,S,100,1:NEXT
 1280 DEFFNtransporter:PROCdelete(x,y)
 1290 IFmappos%=100mappos%=200:xand%=4:yand%=6:xpos%=16:xpos0%=16:ypos%=144:ypos0%=144
 1300 IFmappos%=400mappos%=500:xand%=4:yand%=6:xpos%=16:xpos0%=16:ypos%=144:ypos0%=144
 1310 IFmappos%=2300mappos%=2700:xand%=4:yand%=4:xpos%=16:xpos0%=16:ypos%=96:ypos0%=96
 1320 IFmappos%=2500home%=1
 1330 score%=score%+20:display%=1:FORS=-15TO0:SOUND1,S,255-(15-S)*5,1:NEXT:=1
 1340 DEFFNprints:FORS=-15TO-10:SOUND1,S,100-S*2,1:NEXT:score%=score%+100:prints%=prints%+1:PROCdelete(x,y):=0
 1350 FORS=-15TO-10:SOUND1,S,100-S*2,1:NEXT:score%=score%+100:prints%=prints%+1:PROCdelete(x,y)
 1360 DEFPROCrightnew
 1370 xpos%=0:xpos0%=0:xand%=0:display%=1:mappos%=mappos%+100
 1380 ENDPROC
 1390 DEFPROCleftnew
 1400 xpos%=36:xpos0%=36:xand%=9:display%=1:mappos%=mappos%-100
 1410 ENDPROC
 1420 DEFPROCdownnew
 1430 ypos%=0:ypos0%=0:yand%=0:display%=1:mappos%=mappos%+600
 1440 ENDPROC
 1450 DEFPROCupnew
 1460 ypos%=216:ypos0%=216:yand%=9:display%=1:mappos%=mappos%-600
 1470 ENDPROC
 1480 DEFPROClooselife
 1490 lives%=lives%-1:IFlives%<0death%=1
 1500 SOUND0,-15,4,3:SOUND0,-10,4,6:FORdelay=0TO3000:NEXT
 1510 ENDPROC
 1520 DEFPROCmovealiens
 1530 FORA=0TOalien%-1:X%=xalien%(A)*4:Y%=yalien%(A)*24:A%=1:CALLsprite%:IFyalien%(A)=0PROCnotup:GOTO1570
 1540 X%=xalien%(A)*4:Y%=yalien%(A)*24
 1550 IFyalien%(A)<9ANDRND(2)=1yalien%(A)=yalien%(A)+1:GOTO1570
 1560 yalien%(A)=yalien%(A)-1
 1570 X%=xalien%(A)*4:Y%=yalien%(A)*24:A%=1:CALLsprite%:IFxalien%(A)=xand%ANDyalien%(A)=yand%PROClooselife
 1580 NEXT
 1590 ENDPROC
 1600 DEFPROCnotup
 1610 IFxalien%(A)=9xalien%(A)=0ELSExalien%(A)=xalien%(A)+1
 1620 yalien%(A)=9
 1630 ENDPROC
 1640 DEFPROChome
 1650 CLS:COLOUR3:IFprints%<6PRINTTAB(0,10)"YOU ENTERED THE"'"HOME TRANSPORTER"''"WITHOUT GATHERING"'"ALL THE BLUE PRINTS"
 1660 IFprints%=6PRINTTAB(0,10)"... SPACE ESCAPE ..."''"... IS COMPLETED ..."'''SPC2"CONGRATULATIONS"''SPC1"YOU HAVE COMPLETED"''SPC3"YOUR  MISSION"
 1670 *fx15
 1680 death%=2:IFINKEY600
 1690 ENDPROC
 1700 DEFPROChighscore
 1710 IFscore(7)>score%ENDPROC
 1720 B=7:FORA=6TO0STEP-1:IFscore(A)<score%B=A
 1730 NEXT:FORA=6TOB STEP-1:score(A+1)=score(A):name$(A+1)=name$(A):NEXT:score(B)=score%:name$(B)="":pos%=B:CLS:FORA=1TO3:VDU19,A,0;0;:NEXT:PROCdouble(0,3,"Congratulations"):PRINT'''
 1740 FORA=1TO8:COLOUR1:PRINT';A;". ";:COLOUR2:PRINTname$(A-1);:COLOUR3:PRINTTAB(20-LENSTR$score(A-1));score(A-1):NEXT
 1750 VDU31,2,8+pos%*3,ASC">",19,1,2;0;19,2,3;0;19,3,6;0;23,1,1;0;0;0;:*fx15
 1760 ?&70=line%MOD256:?&71=line%DIV256:?&72=12:?&73=0:?&74=255:X%=&70:Y%=0:A%=0:CALL&FFF1:name$(pos%)=$line%:VDU23,1,0;0;0;0;
 1770 ENDPROC
 1780 IFPAGE<>&2000 PRINT'"Type PAGE=&2000 before loading"CHR$7:END
 1790 PRINT'"Please wait.";
 1800 PROCdata
 1810 PROCcode
 1820 VDU23,129,224,160,191,191,163,224,0,0
 1830 !(PAGE+4)=&F4:RESTORE1780:I%=2+!&1C AND&FFFF:REPEATI%=I%-1:UNTILI%?-1=&0D:?I%=&FF:!&12=I%+1:RUN
 1840 DEFPROCdata
 1850 RESTORE2460
 1860 A=&E00:REPEATdone%=0:READB$:$A=FNdecode0(B$):A=A+LENQ$:UNTILdone%
 1870 A=&1250:REPEATREADB$:$A=FNdecode(B$):A=A+LENQ$:UNTILB$="done"
 1880 ENDPROC
```

Turn to Page 121 ▶

THE PUBLISHER

See us at the MU Show Stand 98

A NO-NONSENSE, NO-GIMMICK DESKTOP PUBLISHING SYSTEM

- ★ INTEGRATES WITH YOUR EXISTING WORDPROCESSOR
- ★ SIMPLE BUT POWERFUL PAGE DESCRIPTION COMMANDS
- ★ ON-SCREEN PREVIEW FROM WORDWISE, VIEW & INTER-WORD

THE PUBLISHER is a single, massive 64K ROM which holds the controlling software and 16 FONTS. Being ROM based, THE PUBLISHER is instantly available, no disc access required. **PREPARE, PREVIEW** and **PRINT** all from **WITHIN** your word processor **£39 + £1 P&P + VAT = £46 INC.**
CONTACT PMS FOR FULL DETAILS, SCREEN-SHOT AND SAMPLE PRINTOUT

ANOTHER QUALITY PRODUCT FROM PMS

GENIE

YOUR WISH...
.. IS MY COMMAND

"stunning", "superb", "well written"... unanimously praised by reviewers

The PROFESSIONAL "POP-UP" for the BBC Micro.

ADDRESS BOOK, CALCULATOR, CALENDAR, PHONE BOOK, NOTEPAD, all you need to get organised!

Battery-backed
£79.35 + £2 P&P

Disk/ROM based
GENIE Junior
£25 + £1 P&P

GENIE Watch RTC
£29.90 + £1 P&P

Utilities disc
£9.95 + £1 P&P

(PRICES INC VAT)

PMS

Permanent Memory Systems
38 MOUNT CAMERON DRIVE
EAST KILBRIDE G74 2ES
SCOTLAND

03552-32796
(24 hour)

EPROMS, 8271

	Ex VAT	Inc VAT
1-9 27128 250nS 21V	4.30	4.95
10+ 27128 250nS 21V	3.87	4.45
1-9 27128 250nS 12.5V	3.22	3.70
10+27128 250nS 12.5V	2.91	3.35
1-9 2764 250nS	2.60	2.99
1-9 27256 250nS	4.22	4.85
10+27256 250nS	3.83	4.40
1-9 TTL/Cmos set	3.91	4.50
1-9 8271 controller	39.13	45.00
1-9 6264 LP 150nS	5.00	5.75
Acorn 8271 DFS	45.22	52.00
Acorn 1770 DFS	45.22	52.00

ROMS

	Ex VAT	Inc VAT
Inter-Word	35.65	41.00
Inter-Sheet	35.65	41.00
Inter-Base	48.70	56.00
Wordwise Plus	37.39	43.00
MEGA 3	71.30	82.00
Spell Master	40.87	47.00
View Spell	27.83	32.00
View 3 Rom	55.65	64.00
View 2.1	38.26	44.00
ViewStore	38.26	44.00
OverView I & II	68.70	79.00
View Professional	62.61	72.00

DISKETTES (100% Error free)

(lifetime warranty)	Ex VAT	Inc VAT
10 Banana Reversible	8.65	9.95
10 3.5" D/S 135tpi	8.61	9.90
10 96tpi D/S D/D + case	6.04	6.95
10 96tpi D/S D/D in box	5.17	5.95
50 96tpi D/S D/D in boxes	17.17	19.75
100 96tpi D/S D/D in boxes	32.09	36.90
40 Disc Box 3.5" + lock	5.17	5.95
50 Disc Box hinged + lock	5.65	6.50
100 Disc Box hinged+ lock	6.52	7.50
Black Library case	1.21	1.39

5¼ DISC DRIVES

	ExVAT	InVAT
Cumana CSX100	90.43	104.00
Cumana CSX400	117.39	135.00
Cumana CD800S	252.17	290.00
MD100A 100k No PSU	84.35	97.00
MD100B 100k & PSU	99.13	114.00
MD400A 400k No PSU	85.22	98.00
MD400B 400k & PSU	100.87	116.00
MD802C 800k No PSU	173.04	199.00
MD802E 800k & PSU	190.43	219.00
MD802D 800k & stand	204.35	235.00

Phone for Viglen & Torch Winchesters

MONITORS

	Ex VAT	Inc VAT
Philips CM8852	251.30	289.00
Philips BM7502 Green	65.22	75.00
Philips TV Tuner	56.52	65.00
Taxan KX P31 Green	68.70	79.00
Taxan KX Amber	82.61	95.00
Taxan KX1202 Green	68.70	79.00
Microvitec 1451	221.74	255.00
Microvitec 1451 AP	260.00	299.00

(Prices inc. BBC Cable)

MASTER/ARCH

	Ex VAT	Inc VAT
Master 128K Micro	365.22	420.00
Archimedes 305 from	699.00	803.35
512 Co-processor	90.00	103.50
Turbo Upgrade	98.78	113.50
Acorn Cartridges	10.87	12.50
Care Cartridges from	8.65	9.95
Reference Manuals	14.00	14.00
View 3/View Sheet Guides	9.00	9.00
Master & B Dust Covers	3.00	3.45

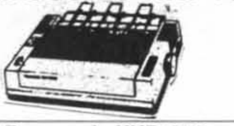
Second user BBC B's available

Philips CM8833
with BBC cable
£249.00 (£216.52+VAT)

VOLTMACE JOYSTICKS

Delta 14B single	11.26	12.95
Delta 3B single	9.52	10.95
Delta 3B twin	15.61	17.95

Panasonic KXP1081



with BBC cable & paper
£159.00 (£138.26+VAT)
with Screen Dump, 2m cable + paper
£165.00 (£143.48+VAT)

	Exc VAT	Inc VAT
KXP1080 Fabric ink ribbon	4.26	4.90
KXP1080 View Printer Driver	7.83	9.00
KXP1080 Control/Dump Rom	13.00	14.95

Panasonic KXP1082
(AS 1081 BUT 160CPS
with BBC cable & paper
£189.00 (£164.35+VAT)

Kaga/Taxan KP815
With BBC cable & paper
£179.00 (£155.65 + VAT)

CITIZEN 120D
with BBC cable & paper
£135.00 (£117.39+VAT)

STAR LC10
with BBC cable & paper
£189.00 (£164.35+VAT)

STAR LC10
with BBC cable & paper
£205.00 (£178.26+VAT)

EPSON LX 800
With BBC cable & paper
£229.00 (£199.13 + VAT)

STAR LC10 Colour
with BBC cable & paper
£259.00 (£225.22+VAT)

EPSON LQ500
With BBC cable & paper
£325.00 (£282.61 + VAT)

JUKI 6100
with BBC cable & paper
£299.00 (£260.00+VAT)

MP480 (480cps)
with BBC cable & paper
£299.00 (£260.00+VAT)

AMSTRAD LQ3500 (24)
with BBC cable & paper
£285.00 (£247.83+VAT)

PRINTER RIBBONS

	Ex VAT	Inc VAT
LX/FX 800 Print Ribbon	3.00	3.45
LX80 Print Ribbon	3.00	3.45
LC10 Print Ribbon	4.00	4.60
NL-10 Print Ribbon	4.80	5.52
120D Print Ribbon	4.00	4.60
KP/PW Print Ribbon	3.39	3.90
Juki 6100 Print Ribbon	1.30	1.50

Phone for quality discounts

PRINTERS/CABLES/Etc.

	Ex VAT	Inc VAT
Panasonic KXP3131 Daisy	233.91	269.00
Epson FX1000	400.00	460.00
Epson FX800	313.04	360.00
1.5m (4 foot) BBC cable	5.70	6.60
2.0m (6 foot) BBC cable	7.74	8.90
Compact printer cable	6.87	7.90
IBM/Archimedes cable	6.00	6.90
LX800 Sheet Feeder	62.61	72.00
LC10 Sheet Feeder	56.52	65.00
NL10 Sheet Feeder	47.83	55.00
6100 Sheet Feeder	188.70	217.00
Printer Dust Covers	4.00	4.60

Phone for our best price before placing your order
EDUCATIONAL & GOVERNMENT ORDERS WELCOME
All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
We are closed some Saturday afternoons
Carriage 92p (80p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

Larger items delivered by Securicor

Micro Dept.
128 West Street,
Portchester,
Hants.
PO16 9XE
Tel: 0705 325354

◀ From Page 119

```
 1890 DEFFNdecode(D$)
 1900 Q$="":FORQ=1TOLEND$:W$=MID$(D$,Q,1
):W=VALMID$(D$,Q+1,1):IFW>1ANDW<10Q$=Q$+
STRING$(W-1,W$):Q=Q+1
 1910 Q$=Q$+W$:NEXT
 1920 =Q$
 1930 DEFFNdecode0(D$)
 1940 Q$="":FORQ=1TOLEND$:W$=MID$(D$,Q,1
):Q=Q+1:IFW$="^"GOTO1980
 1950 IFW$="*"done%=1:GOTO1970
 1960 W$=W$+MID$(D$,Q,1):Q$=Q$+CHR$EVAL(
"&"+W$)
 1970 NEXT:=Q$
 1980 W$=CHR$EVAL("&"+MID$(D$,Q,2)):Q=Q+
2:R=0:FORE=0TO3:IFMID$(D$,Q+E,1)="^"R=E:
E=3
 1990 NEXT:W=VALMID$(D$,Q,R):Q=Q+R:Q$=Q$
+STRING$(W,W$):GOTO1970
 2000 DEFFNxtable320:FORA=0TO31:?P%=A*32
0MOD256:P%=P%+1:NEXT:=pass
 2010 DEFFNytable320:FORA=0TO31:?P%=A*32
0DIV256:P%=P%+1:NEXT:=pass
 2020 DEFFNxsprite:FORA=0TO11:?P%=(A*96+
&E00)MOD256:P%=P%+1:NEXT:=pass
 2030 DEFFNysprite:FORA=0TO11:?P%=(A*96+
&E00)DIV256:P%=P%+1:NEXT:=pass
 2040 DEFPROCcode
 2050 addr=&8E:xlen=&8D
 2060 ylen=&8C:sprv=&8A
 2070 temp=&88:stor=&86
 2080 FORpass=0TO2STEP2
 2090 P%=&900
 2100 [OPTpass
 2110 .sprite PHA
 2120 LDA#0:STAstor+1
 2130 TYA:AND#7:STAstor
 2140 TYA:LSRA:LSRA:LSRA:TAY
 2150 TXA:ASLA:ROLstor+1:ASLA
 2160 ROLstor+1:ASLA:ROLstor+1
 2170 ADCstor:ADCxtable320,Y:STAaddr
 2180 LDA#&58:ADCstor+1:ADCytable320,Y:S
TAaddr+1
 2190 PLA:TAX
 2200 LDA#4:STAxlen
 2210 LDA#24:STAylen
 2220 LDAxsprite,X:STAsprv
 2230 LDAysprite,X:STAsprv+1
 2240 LDAaddr:AND#&F8:STAtemp:STAaddr
 2250 LDAaddr+1:STAtemp+1
 2260 .loop1 LDXylen:.loop2 LDY#0
 2270 .loop3 LDA(sprv),Y
 2280 .eorpos
 2290 EOR(addr),Y:STA(addr),Y
 2300 INY:CPY#8:BNEloop3
 2310 CLC:LDAaddr:ADC#64:STAaddr
 2320 LDAaddr+1:ADC#1:STAaddr+1
 2330 CLC:LDAsprv:ADC#8:STAsprv
 2340 LDAsprv+1:ADC#0:STAsprv+1
 2350 TXA:SEC:SBC#8:TAX:BNEloop2
 2360 CLC:LDAtemp:ADC#8:STAtemp:STAaddr
 2370 LDAtemp+1:ADC#0:STAtemp+1:STAaddr+
1
 2380 LDAxlen:CMP#0:BEQjump1
 2390 DECxlen:BNEloop1
 2400 .jump1 RTS
 2410 .xsprite OPT FNxsprite
 2420 .ysprite OPT FNysprite
 2430 .xtable320 OPT FNxtable320
 2440 .ytable320 OPT FNytable320
 2450 ]NEXT:ENDPROC
 2460 DATA00^003^10102121435243928586 87^
877^9660000030C30F0F07080F1E871E870F00^0
F6^874330^002^C03C0F0F0E010F1E871E870F00
^0F6^1E2CC0^003^00
 2470 DATA808048482C2CA41C92161E^1E7^966
000^002^020100000106080009060001030200^0
010^010A06000903070301080001 0A02010200^0
05^0808090604
 2480 DATA0401080C080102010402040308^009
^0A0408^003^0E^002^080406^002^08^004^C1C
1E0E0F0F070B8DCDCEECCA860E0^F07^E0C10F^0
F3^0690F0
 2490 DATAF0F080070F^0F3^07^832^C1E0F010
0E0F38^382^70^F03^E0^D12^512838381C^1C2^
383870^F03^70^F04^906677^FF4^33D1E0^F010
^ECF2B1D8F4
 2500 DATAF572F2F9F4^722^F4F99080F8F772^
723^7330F473B1^D82^B172E4C8C4F4FFF9B1F8F
6ECF2733131B1^D82^00^802^F8FBF472313172E
4F4F7F4E4727231^B12^F2ECC8C80050F5F6E8C8
8080B07372E4D8FDF67372^E43^E4
 2510 DATAF47331^002^60300010402010807 00
0102000^0010^90^502^A020B0^702^F07090D09
09010^108^A0405090A0^902^E0D0C0A0D06030^
006^00
 2520 DATA00^006^C00020C000E000C000^0029
^011001100100011221122112211 2211221
 2530 DATA1221122152255AA548800CA55A8008
A55A8008A44A8008800880088048844AA5522152
A54A^0026^10^304^30
 2540 DATA303070^7012^3000F0^F02^C0^804^
F0^F03^C0^802^C0^C04^E0^F02^00^F03^30^10
4^F0^F03^70^302^70^704^F0
 2550 DATAF0F0000080^C07^E0^E012^C0^003^
010316343C^789^3C34160301^005^0F^F04^C38
6C3
 2560 DATAF0^F02^C386C3^F04^0F^005^0C86C
2C2860C00080C840C08000C86^C22^860C00^002
6^00
 2570 DATA00^102^30307060506070^402^50^5
04^4040706070^003^F0F0B010F0A050A0F0^002
^D0^503^D0^002^F0A0F0^005^80B0F0A050A0F0
^002^40^403^60^002^F0A0F0^004^00
 2580 DATA000080^8016^683C96C3E170302161
^E12^2D2DE1E16121307 0E1C3963C686121E1F04
B96^782^F0^872^E1^E14^6978964BF0E1216168
4878F02D96E1
 2590 DATAE1F01E1E78^784^69E1962DF078486
861C3963C78E0C04868^782^4B4B78786848C0E0
783C96C361^005^3060C0^C02^E0B0808090^906
^C07000^005^F0^004^00
 2600 DATAF0^002^E0^102^E0^102^E000F0^00
6^F0^005^F0^002^70^402^70^403^00F000^005
^C06030^302^70D01010D0^502^D0^104^E0^002
^FE*
 2610 DATAC9CCFC.5ICC.C.C3.C3.C.3C..CC.C
C..C.3C..C..C.C.C..C..C.ICC.3CCIC.CC.8C5
..C4C4..C6.6ICCIC.6CC.IC.5CC..IC.4CC.C.I
C..ICC.C..IC..CC..C..ICJCC.KC.3IC6..C4
 2620 DATAC4..C5I.6ICC.8CC.D6.CC.G.D..D.
CC.D.3DD.CC.D6.CC.8CCI.6IC5..C4D4..D5.6I
D3.D.3ID.DD.D6.DD.3ID.3DD.ID..ID.DD.D6.D
DID.3ID.D3.7D5..D4
 2630 DATAC4..C5FCC.5CC.CG.5CCI.EC.4CC.I
.CG.4CI.I.EC.3C.I.I.CGC3..I.I.IC3J..I.I.
FC9CCD9DDI.4IIDDDID5.IDD.5D..DD.EEKE.4D.
3E.5D.E.3D..DDID5.ID3I.4IID9DD
 2640 DATAC9CCFG.4IC4.7C9.C.3CD3C.5CD3C.
.C.C6.CC.8C3.5IC9C3E9EE.IE.E.3E3.E.4GEE.
3E..E.EE.E.3EE..E.E.EEFE..E.E.IE.E.EE.KE
E..E.EE.6E.E9EE
 2650 DATAD9DDE.6IDD.E.6DD..E.5DD.9D.4E.
4D.5E..DD.6E.DDB.6ED5..D4D4..D6FD..D5FG.
5D4.6D4.D4.3DD.D4.3DD.6D3FG.5D4ID..D8..D
4
 2660 DATAD4..D5B.5CIDD.5CI.DD.IC..CI.D.
6I.ID.6I.IDD..IC.CI.DD.5CI.DD.6CID9DDC9C
C.3E.4CC.E.E.E..CC.E.E.E..C..E.E.E.5E.E.
E.3C.E.E.E..CC.E.E.E..CC.E.3E..C9CC
 2670 DATAE9EE.8EEC4..B.EECB.6E.C4.B..E.
5C4EE.B..C..CEE.3BC4EE.7BE5..E4D4..D5.8D
D.DI..ID.DD.DDIIDD.D..ID4I.5IDDI.3DD.6D3
IDD..DDIDD.8D9DD
 2680 DATAC9CCFC.4CFCCG.6GCC.3DGD..C.4GF
G.7DGD.3C.8CCG.6GCCFC.4CFC5..C4E4..E7.4E
5IE.4E3.3IEIE.E.IE.9.IEIEIE.EIE.6E3.5FE5
IE..E7..E4
 2690 DATAE4..E5.8EEIEI..IEIEEIEI..IEIEE
.IE..EI.EE.IE..EI.EEIEFEEKEIEEIE.4EIEE.8
E9EEC9C9C9C4.4B.9.6C9C9C9C4
 2700 DATAE9EE.8EE.3CCGC.EE..C3FC.EE..C3
IC..E..GI3C..E..C4..EE.8EE.8E5..E4D4..D6
I.4IIDDIDI.4IDD.IDI..B.D.3IDI.3D.4IDI..D
D.4IDI.DDI.4IDBDDII.6D9DD
 2710 DATAC9CC.7KCC.D..D.3CC.ID.ID..C.3I
D.ID.C.4ID.3CC.4ID..CC.5ID.CC.8C5..C4C4.
.C5.5G.ICC.4C.IICC.3C.II.C.3C.II.FC..C.I
I.FFC3.II.F3CC.II.F4CCII.F4.C9CC
 2720 DATAD9D9D4I7D3ID5GD3ID.6DDIDB.5DDI
D..D6ID..D6FG..D8..D4E4..E5.8EE.5IE.EEIE
IE.4E.9.4IEIEIE.E..IE.4EEIE.3IE.EE.8E5JE
5
 2730 DATAD9DD..GF5DD..GF5DD..GF5D.3GF5D
.3GF5DD..GF5DD..GF5DD..GF5D9DDC5JC7..G.C
7..C5.C.4C.CC.8CC.8CC.C.4C.C5..C7.4C7..C
4
 2740 DATA.3E..E.7E.E.6E..E.5E..E4..E..E
E.3EE..E.3E.EE.E..EE..EE.3EE..E..E.EE..E
.4EE..E.3.E3..E3.E3.4E5.6E4.6E4.6E4.6E4.
6E4.6E5.4E3.E8.
 2750 DATAC9CCC.F.F.F.CC.C.F.F.FCCI.C.F.
F.C..I.C.F.FC.3I.G.F.CC.3I.C.FCCI.3I.C.C
C.I.3I.C6..C4D4..D6.7DD.D..D.B.DDB.D..D.
.D.4D..D.D.5DB.D3.D.3D..DD.BD.3D.DD..KD.
3BD9DD,done
```

Turn to Page 122 ▶

Get it right!

```
 10 = 57D1 1
 20 =    0 1
 30 =    0 1
 40 =    0 1
 50 =    0 1
 60 = E8B6 A
 70 = D82D 4
 80 = DEBB 2
 90 = BFBA 8
100 = 5255 2
110 = 9E04 B
120 = 53CE 8
130 = 344C 3
140 = EC1A C
150 = 11AA F
160 =  7D4 5
170 = BF0B D
180 = 65B4 4
190 = 3745 D
200 = C308 2
210 = ED0F 3
220 = A38B 5
230 = BD90 F
240 = 76D2 C
250 =  9D6 9
260 = E531 0
270 = F931 6
280 = CA6C 2
290 = 8000 C
300 = F944 C
310 = 47C4 D
320 = 50F8 6
330 = A633 C
340 = 3B56 C
350 = 9F14 4
360 = 74F3 E
370 = 81CC 5
380 = BFBA 8
390 = B884 F
400 = 430B 3
410 = C271 C
420 = B0B6 0
430 = 7491 B
440 = 1916 3
450 = 7B4A F
460 = CC68 9
470 = ED0F 6
480 = 2AA8 F
490 = 48A3 5
500 = 1FE7 6
510 = ED0F D
520 = C225 0
530 = AD21 8
540 = 4E41 C
550 = D821 E
560 = A6A5 7
570 = ED0F F
580 = A2F0 0
590 = 8372 8
600 = ACCB 2
610 = ED0F 4
620 = 5A41 7
630 = C78B 7
640 = 5096 3
650 = 994D C
660 = 270A 7
670 = 80EF F
680 = 4019 5
690 = 4D8B D
700 = 7A93 6
710 =   AD 9
720 = ED0F 5
730 = D189 F
740 = 17C2 E
750 = 34FC 6
760 = AFDC 4
770 = FDEB 9
780 = ED0F 6
790 = 68C6 8
800 = 6113 C
810 = F3E4 9
820 = E62C 1
830 = 4527 E
840 = ED0F A
850 = E053 9
860 = E919 8
```

◄ From Page 121

```
                 1160 = D318 A   1480 = 4923 F   1800 = FCB7 1   2120 = AA54 9   2440 = 2EAE D
                 1170 = A9E8 E   1490 = 2F90 C   1810 = F56C 9   2130 = 2DAA 5   2450 = A98C 2
                 1180 = 7ECF 8   1500 = 8FB8 7   1820 = A08F 1   2140 = 8EE1 5   2460 = 2B71 F
 870 = E488 1    1190 = E5F8 3   1510 = ED0F 2   1830 = 6783 3   2150 = 7E29 B   2470 = 3802 0
 880 = D625 8    1200 = 459A 4   1520 = AAB4 C   1840 = 1640 D   2160 = 37F5 5   2480 =  B19 1
 890 = B518 0    1210 = C689 9   1530 = B6BC F   1850 = 2ACB 6   2170 = 31B1 9   2490 = E995 6
 900 = ED0F 4    1220 = 5BBC B   1540 = 31E1 2   1860 = 75F4 A   2180 = 72A3 E   2500 = 56A6 F
 910 = 958C B    1230 = 2D41 E   1550 = F499 5   1870 = BAB7 8   2190 = 1311 8   2510 = 6854 D
 920 = D660 E    1240 = 71DA 3   1560 = 38B0 D   1880 = ED0F 3   2200 = 80B2 A   2520 = B04B 2
 930 = AAC1 0    1250 = 9A52 7   1570 = AD53 5   1890 = 5D61 F   2210 = 7B43 E   2530 = 649A B
 940 = B37F D    1260 = 3AD6 B   1580 = 2C83 0   1900 = FC87 C   2220 = 82FE A   2540 =  853 D
 950 = BF94 9    1270 = 390B 6   1590 = ED0F A   1910 = 9FBB 3   2230 = 515A 2   2550 = 7137 0
 960 = ED0F 2    1280 = 1A7F 8   1600 = 6723 9   1920 = DE9C A   2240 = 82ED 2   2560 = 769B 7
 970 = A9FD 2    1290 = AFFC 8   1610 = 844D B   1930 = A2B3 0   2250 = 4783 6   2570 = AEF6 F
 980 = 5E6A 0    1300 = 561A B   1620 = D0D3 D   1940 = 30F8 5   2260 = D8E1 8   2580 = A810 8
 990 =  29A 6    1310 = 52D3 D   1630 = ED0F 7   1950 = EB9D 7   2270 = 3990 8   2590 = 4D85 5
1000 = E531 3    1320 = 8AFC 3   1640 = BB1C C   1960 = DD10 0   2280 = 1EB7 F   2600 =  448 E
1010 = 6F8B 2    1330 = C6BE C   1650 = 7CE0 C   1970 = 80A8 7   2290 = 1E7C 6   2610 = 1EE8 0
1020 = ED0F A    1340 = F183 C   1660 = A699 2   1980 = A40C B   2300 = E79C 2   2620 = CD42 6
1030 = EE40 6    1350 = 50F7 8   1670 = 11AA 3   1990 = DF72 1   2310 = E323 1   2630 = 4B3A 2
1040 = 1F43 0    1360 = 8118 1   1680 = A223 0   2000 = D496 C   2320 = 4DE3 1   2640 = 1612 F
1050 = ED0F 3    1370 = C221 C   1690 = ED0F D   2010 = 7212 4   2330 = A665 A   2650 = D094 1
1060 = D9D2 6    1380 = ED0F 9   1700 = 7FAA C   2020 = F2EF 7   2340 = 78AA 9   2660 = 431A 9
1070 = C344 2    1390 = F4FD 8   1710 = 96A9 7   2030 = DDFA 6   2350 = DB41 5   2670 = 85D5 3
1080 = F2D6 9    1400 = 892E 3   1720 = 2711 8   2040 = 1F9B F   2360 = 57BA 2   2680 =  9C9 2
1090 = ED0F E    1410 = ED0F D   1730 = EC71 5   2050 = 77B0 1   2370 = C6AB 1   2690 = B594 1
1100 =  70B 5    1420 = 3C55 9   1740 = A633 9   2060 = C5F6 C   2380 = E471 E   2700 = 1B58 E
1110 = A336 5    1430 = 4BFD 1   1750 = 50AB 4   2070 = 9FE1 4   2390 = 4D0A 2   2710 = D24A 3
1120 = 8DAA F    1440 = ED0F 5   1760 =  483 1   2080 = C134 1   2400 = FAC8 5   2720 = CDE8 B
1130 = DC87 B    1450 = B7F9 4   1770 = ED0F F   2090 = C92F C   2410 = A2D4 8   2730 = D6DA 9
1140 = 8DDD B    1460 = 5E74 A   1780 = 4E5C D   2100 = 5BBE 2   2420 = 2F06 0   2740 = 59DD C
1150 = F838 6    1470 = ED0F 9   1790 = 1AD6 0   2110 = 575F 8   2430 = F28E B   2750 = 699D 7
```

This is one of hundreds of programs available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

REAL TIME
CONTROL APPLICATIONS
From Paul Fray Ltd

For School, Business, Home or Laboratory

SPIDER The Software

Fifty additional keywords expanding BASIC's control over the User Port, Serial Port and keyboard by invoking BASIC procedures from external events.

- *Foreground/Background processing*
- *ROM/RAM combination takes no memory*
- *Leaves BASIC programs unaffected*
- *Easy to install with no soldering*

— FROM £65 —

TERMITE The Hardware

- *Eight configurable input/output lines*
- *Status indicators for each line*
- *Outputs rated at 2A, 5 to 30V DC*
- *Opto-isolated and fused for safety*
- *Fully compatible with SPIDER*
- *Comprehensive manual including driver utilities*
- *Ideal for driving motors, lamps, sensors etc.*

— ONLY £79 —

Prices inclusive of VAT. Please add £3 for p&p

We also supply a full range of industrial digital, analogue and serial cards for use with SPIDER. For more information on any Paul Fray product please telephone (0223) 66529

(Trade Enquiries Welcome)

Paul Fray Ltd, Willowcroft, Histon Road, Cambridge CB4 3JD

DABS PRESS **Get Expert with a Dabhand Guide**

Books and Software for BBC and Mini Office Users

MiniDriver: Printer Power for Mini Office II Users
If you use Mini Office II then our MiniDriver ROM is simply a **must**. It provides incredibly easy printer control from within any module, a built-in NLQ printer font, on-screen preview and a Viewdata terminal. It adds some 40 extra embedded commands. Price £24.95 for ROM, support disc and manual. SRAM version £19.95.

VIEW: A Dabhand Guide by Bruce Smith
This highly acclaimed guide is invaluable reading for all users of VIEW both new and experienced. The top-selling BBC book of the year! Don't miss it. Price just £12.95 or £17.95 with programs disc.

ViewSheet/ViewStore: A Dabhand Guide
Don't let these two ROMs sit idle in your BBC or master put them to work with this bumper 352 page tutorial and reference guide. Amazing value at just £12.95 or £17.95 with programs disc.

C: A Dabhand Guide for Archimedes, Master, BBC
"A very good reasonably priced introduction to C..." is how Beebug described our 512 page guide to C for the Archimedes, Master and Beeb. It details from first principles how to program in the language that is fast becoming the natural successor to BBC BASIC. Book: £14.95. Disc: Archie £9.95, Beeb/Master £7.95. Book and disc together: Archie £21.95, BBC/Master £19.95 (£21.95 for 3.5").

Bruce's Bumper Bundle - Just £4.95!
Bruce Smiths complete guide to machine code programming. Two books (400 pages) and two discs (90 programs). BBC or Master.

Send or phone for our FREE catalogue NOW!

Prices inc. VAT and p&p in UK. **ACCESS/VISA** accepted by post/phone/mailbox. Products available from most dealers. Free catalogue on request. Add £2.50 (£12 air) if outside UK. Official and trade orders welcomed. See us at The Micro User Show.

DABS PRESS (MUN) 5 Victora Lane, Whitefield, Manchester M25 6AL
Tel: 061-766-8423 • Prestel 942876210 • Microlink 72:MAG11596

WITH PAYROLL

A LOW COST DISC BASED PROFESSIONAL ACCOUNTING PROGRAM

For the BBC Computer

"Micro-Trader"

INTEGRATED SALES PURCHASE AND NOMINAL LEDGERS

Designed for business use by a business man. "Micro-Trader" offers full Sales and Purchase Ledger facilities including SALES INVOICE and STATEMENT PRINTING with a capacity of up to 1,000 accounts and 5,000 transactions per month.

Nominal Ledger features quick and easy entry of everyday transactions. Up to 6 Bank Accounts, full V.A.T. facilities, Journal Posting. Full Reporting for individual accounts, Audit Trail, Trial Balance, Profit & Loss and Balance Sheet.

ONLY £200 + V.A.T.

"MICRO-STOCK"

Stock Control program, fully integrated with "Micro-Trader". 4,000 Stock Items with user defined Codes. Invoice and Credit Notes and Cash Sales routine. Full Stock Held Reports.

£75.00 + V.A.T.

"EXTENDED PAYROLL"

Micro-Aid Full Feature Extended Payroll. For use stand alone or integrated with "Micro-Trader".

£49.95 + V.A.T.

"MICRO-MAILER"

A Mailmerge program, fully integrated with "Micro-Trader". With a user Database.

£30.00 + V.A.T.

Compact
BRITISH BROADCASTING CORPORATION
MASTER SERIES MICROCOMPUTER

Archimedes

PHONE TODAY FOR A FREE FACT SHEET

MEADOW COMPUTERS

11, LONDON STREET, WHITCHURCH, HAMPSHIRE, RG28 7LH

Telephone: Whitchurch (0256) 892008

The note Music System

- *Features unparalleled create, edit, play and print tunes facilities*
- *Is sophisticated, yet simple to use*
- *Even the Instruction Manual has been applauded*

DISC PACK: EDITOR · SYNTHESISER · KEYBOARD · LINKER · PRINTOUT·SONG AND SOUND LIBRARY · WAS £29.95 **SPECIAL OFFER £20.00 INC VAT.** PLEASE ADD £1.25 P&P PER ORDER.

ADDITIONAL SONG LIBRARY DISC: 2 TOCCATA AND CAROLS · 3 400 YEARS OF MUSIC · 4 MAINLY BACH · 5 IAN WAUGH ORIGINALS · 6 OLD FAVOURITES · £4 EACH INC VAT · POSTAGE FREE.

NOW WORKS ON BBC B, B+, MASTER AND MASTER COMPACT.

NEW UTILITIES DISC: KEYBOARD→MUSIC FILE CONVERTER · PLAY FROM BASIC UTILITY · TMS MUSIC FILE CONVERTER · MUSIC EDITOR FILE CONVERTER · £6 INC VAT · POSTAGE FREE.

ECONET VERSION: £89.70 INC VAT PLUS £1.25 POSTAGE. AMSTRAD AND COMMODORE 64 VERSIONS ALSO AVAILABLE.

PLEASE NOTE: Cassette systems are no longer being supported. Upgrades to disc available.

ORDERS TO: SYSTEM APPLIED TECHNOLOGY LTD, DEPT B, FIFTH FLOOR,
SHEAF HOUSE, SHEAF STREET, SHEFFIELD S1 2BP

(0742) 768682 **DEALER ENQUIRIES WELCOME**

ISLAND • LOGIC   SYSTEM APPLIED TECHNOLOGY

MICRO MEDIA Computer Supplies Ltd.

5¼ Unbranded Discs

	25	50	100	250
SS/DD	9.30	18.40	34.60	73.60
DS/40T	10.40	19.60	36.30	76.25
DS/80T	12.20	23.10	43.10	90.85
DS HD PC AT's	39.90	71.45	133.55	293.25

5¼ Coloured Discs

	25	50	100	250
DS/40T	12.45	23.55	39.95	91.50
DS/80T	13.45	25.40	47.40	99.95

5¼ Reversible

2 Index Holes & Notches

	25	50	100	250
DS/80T	15.50	28.50	55.00	125.00

3½

	10	20	50	100
DS DD	11.90	22.90	54.55	104.35

5¼ Branded MICRO MEDIA Discs

	25	50	100	250
SS/DD	6.40	12.10	28.30	51.70
DS/40T	7.50	14.15	33.15	61.30
DS/80T	8.50	15.95	36.25	71.25
DS/HD PC AT's	17.90	34.30	81.20	149.80
REVERSIBLE	9.75	18.50	43.85	81.50

All discs supplied are with labels 5¼" write protects, envelopes & hub rings. 100% certified error free lifetime guarantee.

3½ Branded MICRO MEDIA Discs

	10	20	50	100
SS/DD	13.70	26.90	64.40	122.60
DS DD	14.90	28.60	68.20	130.50
DS HD	38.95	74.25	176.80	327.80

Printer Ribbons

Price each Ribbon	2	6	12
Acorn Ink Jet	2.79	2.55	2.45
Acorn AP100	2.85	2.65	2.45
Centronics GLP	3.65	3.45	3.15
R, BL, GR, BR, Y	4.65	4.40	4.00
Canon 1080/1156	2.99	2.85	2.70
R, BL, GR, BR, Y	4.95	4.65	4.25
Citizen 120D	4.70	4.35	4.15
Epson MX FX RX80 FX800	3.35	3.20	3.05
R, BL, GR, BR, Y	4.70	4.45	4.25
MX100/FX1000/FX105	3.90	3.70	3.50
R, BL, BR	4.95	4.70	4.50
LX 80/86, GX 80	2.80	2.65	2.40
R, BL, GR, BR, Y	3.65	3.45	3.30
EX 800	5.98	5.65	5.20
Juki 6100 MS	2.85	2.70	2.60
Kaga KP810/910	2.99	2.85	2.70
R, BL, GR, BR, Y	4.95	4.65	4.25
Panasonic KXP	4.65	4.40	4.20
R, BL, GR, BR, Y	6.50	6.20	5.85
Shinwa CP80MS	4.10	3.85	3.55•
Star NL10	5.25	4.95	4.70
R, BL, GR, BR, Y	6.15	5.85	5.55

Please mix colours and types for best prices.
R = Red, BL = Blue, GR = Green, BR = Brown, Y = Yellow

If the ribbon you require is not listed please let us quote.

Computer Paper

Plain fanfold, micro perf edges

Size	Weight gsm	1000's per bx	Price per box 1 box	3 bxs	5 bxs
11x9½	60	2000	14.50	13.90	12.90
11x9½	60	1000	9.50	–	–
11x9½	80	2000	19.75	18.10	16.75
11x9½	80	1000	11.90	–	–
EXACT A4					
11⅔x9¼	70	2000	20.50	12.85	18.30
	90	1000	13.90	12.85	11.90

Computer Labels

Continuous fanfold, sprocket fed

Price per 1000	1000	3000	5000
70 x 36 2¾x1⁷⁄₁₆	4.85	3.85	4.30
89 x 36 3½x1⁷⁄₁₆	5.35	4.50	4.10
89 x 49 3½x1¹⁵⁄₁₆	7.50	6.60	5.90

Please state no of labels across sheet (1, 2 or 3)

Disc Storage Boxes

Price each	1+	3+	6+
MD 120 5¼ x 120	11.90	11.30	10.75
MD 100 5¼ x 100	9.90	9.40	8.95
MD 50 5¼ x 50	7.50	7.10	6.75

Printer Stands

	Price each		
Space Saver 80 col	30.50	28.50	26.95
132 col	35.50	32.90	31.25
Coated Wire 80 col	13.70	12.75	11.85
132 col	15.70	14.60	13.60

Swivel Bases

	Price each		
12" 55 x 280 x 260 mm	12.90	11.75	10.90
14" 55 x 355 x 320 mm	14.90	13.55	12.75

Freepost, Dept. MU, Rydal Mount, Baker St., Potters Bar, Herts. EN6 3BR

(5 lines) Access & Visa

0707 52698

Out of Office Hours (Answer Machine)

Orders despatched 24 hrs

Please allow 5 days for delivery

For guaranteed next day delivery please ring - from £1.50 extra.

Postage covers UK only.

ALL PRICES INCLUSIVE OF DELIVERY AND VAT

Personal callers welcome
Weekdays 8.30am - 5.30pm
Saturdays 9.30am - 1.00pm

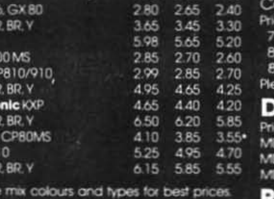
SPRING CATALOGUE OUT NOW 16 PAGES

Please ring or write for your free copy.

MD120

Anti Static

MD100


Space Saver

automatic refolding of paper

adjusts by front dial turn 360°
Tilt up & down 25°

12" 55 x 280 x 260mm
14" 55 x 355 x 320mm

Wire Printer Stand

80 col	H100	W310	D610mm
132 col	H100	W430	D610mm

-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-

◀ From Page 65

```
  670 ENVELOPE 1,128,-4,0,0,10,0,0,80,0,
0,-1,126,126
  680 ENVELOPE 2,1,5,-8,0,4,5,7,126,0,0,
-1,126,126
  690 ENDPROC
  700 DATA "top left ","top right ","bot
tom right ","bottom left ","top middle "
,"middle right ","bottom middle ","middl
e left ","central "
  710 DEF PROCdrawscreen
  720 FOR Y%=0 TO 1023 STEP 8
  730 MOVE ld%-dg% DIV 2,Y%
  740 PLOT 21,1279,Y%
  750 MOVE ld%-dg% DIV 2+4,Y%+4
  760 PLOT 21,1279,Y%+4
  770 NEXT
  780 GCOL 0,1
  790 FOR C%=0 TO 8
  800 PROCcirc(dx%(C%),dy%(C%),128)
  810 NEXT
  820 GCOL 0,2
  830 FOR B%=0 TO 3
  840 PROCcirc(bx%(B%),by%(B%),64)
  850 NEXT
  860 GCOL 4,0
  870 PRINT TAB(17,0) "RUBIK'S CLOCK"
  880 VDU 28,0,31,7,0,30
  890 ENDPROC
  900 DEF PROCstart
  910 PROCvert("Hold the puzzle with eit
her face up in front of you.")
  920 ENDPROC
  930 DEF PROCsolve_central
  940 IF FNask_dial(8) THEN PROCsolve_ce
ntral_2
  950 PROCsolved(8)
  960 ENDPROC
  970 DEF PROCsolve_central_2
  980 PROCsolving(8)
  990 PROCall_up
 1000 PROCturn(0)
 1010 PROCvert("Set all buttons up, then
 turn the "+d$(0)+"dial until the "+d$(8
)+"dial points to 12.")
 1020 PROCwait
 1030 PROCall_up
 1040 PROCturn(0)
 1050 PROCsolving(8)
 1060 ENDPROC
 1070 DEF PROCall_up
 1080 FOR B%=0 TO 3
 1090 PROCset_but(B%,TRUE)
 1100 NEXT
 1110 ENDPROC
 1120 DEF PROCsolve_middle(D%)
 1130 IF FNask_dial(D%) THEN PROCsolve_m
iddle_2(D%)
 1140 PROCsolved(D%)
 1150 ENDPROC
 1160 DEF PROCsolve_middle_2(D%)
 1170 PROCsolving(D%)
 1180 PROCset_middle_buttons(D%)
 1190 PROCset_but(D%,TRUE)
 1200 PROCturn(D%+3)
 1210 PROCvert("Set buttons as shown, th
en turn the "+d$((D%+3) MOD 4)+"dial unt
il the "+d$(D%)+"dial points to 12.")
 1220 PROCwait
 1230 PROCturn(D%+3)
 1240 PROCvert("Change the "+d$(D% MOD 4
)+"button to be down.")
 1250 PROCset_but(D%,TRUE)
 1260 PROCset_but(D%,FALSE)
 1270 PROCwait
 1280 PROCturn(D%+3)
 1290 PROCvert("Now turn the "+d$((D%+3)
 MOD 4)+"dial until the "+d$(8)+"dial po
ints to 12.")
 1300 PROCwait
 1310 PROCset_middle_buttons(D%)
 1320 PROCset_but(D%,FALSE)
 1330 PROCturn(D%+3)
 1340 PROCsolving(D%)
 1350 ENDPROC
 1360 DEF PROCset_middle_buttons(B%)
 1370 PROCset_but(B%+3,TRUE)
 1380 PROCset_but(B%+1,FALSE)
 1390 PROCset_but(B%+2,FALSE)
 1400 ENDPROC
 1410 DEF PROCsolve_edge(D%)
 1420 IF FNask_dial(D%) THEN PROCsolve_e
```

ROOM 7 SOFTWARE

SOCCER BOSS
Football Management Simulation Game
£3.99

SUPER I BOOT
Disc Auto Menu/ Manager
£6.90

IDEAS FOR XMAS

Fully bound software catalogue 50p P&P Refundable with order or free with each purchase

EASY BANKER
Bank Program
£8.50

INTRODUCTION TO STATISTICS
£9.95

INVESTMENT ANALYSER 2
Personal Finance
£25.00

MATRIX
Mathematical Matrices made easy
£9.20

BUILDERS SOFTWARE
Electrical Cable Selector £17.25
Central Heating Calculator.£23.00
Pocket Engineer £34.50

POOLS CHEQUE
£12.50

ALL PRICES INCLUDE VAT AT 15%

Most of our programs are available for the Electron/B/B+/Master and Compact. 3.5" & 5.25" disc, and in DFS or ADFS

Also covered by our catalogue – Soccer Boss, Pools cheque, Investment Analyser 2, Matrix, Central Heating calculator, Electrical cable selector, Structural Beam Calculator, Introduction to Statistics, Easy Banker

Letters/cheques to: W.L. Computer Services, Dept. 4,
First floor, H.S.L. Building, 437 Warrington Road,
Rainhill, Merseyside, L35 4LL. Tel. 051-426 9660

VISA

ComputerRepairs (UK)
2 Austins Place, High Street,
Hemel Hempstead, Herts, HP2 5HN.
Telephone: 217624

REPAIRS
Archimedes P.O.R.
BBC Model B £34.50
Electron £29.50

FLIP-OVER FUNCTION STRIP HOLDERS

Each holder comes with 10 clear plastic sleeves. Easily fitted to the BBC or BBC - Master series.

only £6.50

Flip over function strip holder £6.50
Extra sleeves for above ....£0.40 each
Blank function strip cards..........10 for £1.25
Function strip design software £4.50
SPECIAL OFFER
1 holder, 1 disc copy of software and 10 cards.......£10.00
OR 1 holder, 10 extra sleeves and 10 cards £10.00

<CR> VOLUME CONTROL SWITCH

Hardware volume control switch easily fitted to BBC.........£7.50

We specialise in 2nd user equipment
Telephone for price.

All prices include post, packing etc. in (G.B.)

```
dge_2(D%)
 1430 PROCsolved(D%)
 1440 ENDPROC
 1450 DEF PROCsolve_edge_2(D%)
 1460 PROCsolving(D%)
 1470 PROCset_edge_buttons(D%)
 1480 PROCset_but(D%,TRUE)
 1490 PROCturn(D%+3)
 1500 PROCvert("Set the buttons as shown
. then turn the "+d$((D%+3) MOD 4)+"dial
 until the "+d$(D%)+"dial points to 12."
)
 1510 PROCwait
 1520 PROCturn(D%+3)
 1530 PROCvert("Change the "+d$(D%)+"but
ton to be down.")
 1540 PROCset_but(D%,TRUE)
 1550 PROCset_but(D%,FALSE)
 1560 PROCwait
 1570 PROCturn(D%+3)
 1580 PROCvert("Now turn the "+d$((D%+3)
 MOD 4)+"dial until the "+d$(8)+"dial po
ints to 12.")
 1590 PROCwait
 1600 PROCset_edge_buttons(D%)
 1610 PROCset_but(D%,FALSE)
 1620 PROCturn(D%+3)
 1630 PROCsolving(D%)
 1640 ENDPROC
 1650 DEF PROCset_edge_buttons(B%)
 1660 PROCset_but(B%+1,TRUE)
 1670 PROCset_but(B%+2,TRUE)
 1680 PROCset_but(B%+3,TRUE)
 1690 ENDPROC
 1700 DEF PROCdone
 1710 PROCvert("You have now solved Rubi
k's Clock!")
 1720 SOUND 1,2,100,30
 1730 ENDPROC
 1740 DEF PROCturn_over
 1750 PROCvert("Now turn the puzzle over
 to the other side.")
 1760 ENDPROC
 1770 DEF PROCok(D%)
 1780 MOVE dx%(D%)-64,dy%(D%)+16
 1790 VDU 5
 1800 PRINT "OK ?"
 1810 VDU 4
 1820 ENDPROC
 1830 DEF PROCsolving(D%)
 1840 MOVE dx%(D%)-112,dy%(D%)+16
 1850 VDU 5
 1860 PRINT "SOLVING"
 1870 VDU 4
 1880 ENDPROC
 1890 DEF PROCsolved(D%)
 1900 MOVE dx%(D%)-16,dy%(D%)+112
 1910 VDU 5,224,10,8,225,10,8,225,10,8,8
,8
 1920 PRINT "SOLVED"
 1930 VDU 4
 1940 ENDPROC
 1950 DEF PROCturn(D%)
 1960 MOVE dx%(D% MOD 4)-64,dy%(D% MOD 4
)-50
 1970 VDU 5
 1980 PRINT "TURN"
 1990 VDU 4
 2000 ENDPROC
 2010 DEF PROCset_but(B%,up%)
 2020 MOVE bx%(B% MOD 4)-64,by%(B% MOD 4
)+16
 2030 VDU 5
 2040 IF up% PRINT " UP " ELSE PRINT "DO
WN"
 2050 VDU 4
 2060 ENDPROC
 2070 DEF PROCvert(T$)
 2080 P%=INSTR(T$, " ")
 2090 REPEAT
 2100 PRINT LEFT$(T$, P%-1)
 2110 T$=RIGHT$(T$, LEN(T$) - P%)
 2120 P%=INSTR(T$, " ")
 2130 UNTIL P%=0
 2140 PRINT T$
 2150 ENDPROC
 2160 DEF PROCcirc(X%,Y%,R%)
 2170 FOR S%=-R% TO R% STEP 4
 2180 Z%=SQR(R%*R%-S%*S%)
 2190 MOVE X%+S%,Y%+Z%
 2200 DRAW X%+S%,Y%-Z%
 2210 NEXT
 2220 ENDPROC
 2230 DEF PROCwait
 2240 PRINT
 2250 PROCvert("Any key to cont...")
 2260 SOUND 1,1,150,1
 2270 *FX 21 0
 2280 G%=GET
 2290 CLS
 2300 ENDPROC
 2310 DEF FNask_dial(D%)
 2320 *FX 21 0
 2330 A%=152
 2340 X%=0
 2350 PROCvert("Is the "+d$(D%)+"dial at
 12?")
 2360 SOUND 1,1,250,1
 2370 REPEAT
 2380 REPEAT
 2390 PROCok(D%)
 2400 PROCdelay
 2410 PROCok(D%)
 2420 PROCdelay
 2430 UNTIL (USR(&FFF4) AND &01000000)=0
 2440 G$=GET$
 2450 UNTIL INSTR("YyNn",G$) <> 0
 2460 CLS
 2470 IF INSTR("Yy",G$)=0 THEN =TRUE ELS
E =FALSE
 2480 DEF PROCdelay
 2490 N%=TIME
 2500 REPEAT UNTIL TIME-N%>10
 2510 ENDPROC
```

This is one of hundreds of programs available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

Get it right!

```
  10 =    0 0 |  430 = 27EB A |  850 = 2C83 8 | 1270 = 4B77 4 | 1690 = ED0F A | 2110 = EEDB 4
  20 =    0 0 |  440 = 4DF5 C |  860 = AD7A 4 | 1280 = 3A85 5 | 1700 = D5E6 5 | 2120 = 9168 6
  30 =    0 0 |  450 = 930B 2 |  870 = 6F49 8 | 1290 = 1F04 B | 1710 = E060 C | 2130 = 8ADC A
  40 = 7054 4 |  460 = 3F45 7 |  880 = DB8A 4 | 1300 = 4B77 3 | 1720 = 1DD3 7 | 2140 = C9A2 0
  50 = DEBB 7 |  470 = F961 E |  890 = ED0F 5 | 1310 = 80EB F | 1730 = ED0F 1 | 2150 = ED0F 4
  60 = 9418 C |  480 = 1040 0 |  900 = 9328 0 | 1320 = 3E82 E | 1740 = D317 3 | 2160 = BCA8 D
  70 = 9D5F A |  490 = A5C2 9 |  910 = 4BE2 D | 1330 = 3A85 C | 1750 = B91E 2 | 2170 = 7768 2
  80 = 4B77 0 |  500 = E1CF F |  920 = ED0F A | 1340 = 8D1A F | 1760 = ED0F 9 | 2180 = D029 C
  90 = F9AE A |  510 = C095 A |  930 = FA9A D | 1350 = ED0F A | 1770 = 8935 2 | 2190 = B679 0
 100 = 2CD5 4 |  520 = B77E C |  940 = E4EB 3 | 1360 = 56BE 5 | 1780 = 2625 E | 2200 = F0A0 4
 110 = 4B77 0 |  530 = 1E92 B |  950 = A16E 9 | 1370 = 6D10 4 | 1790 = EC10 4 | 2210 = 2C83 1
 120 = A16E 8 |  540 = 8141 C |  960 = ED0F F | 1380 = 6CC0 0 | 1800 = 49BF 6 | 2220 = ED0F 2
 130 = F9AE 9 |  550 = B9B8 3 |  970 = D669 0 | 1390 = F71C D | 1810 = FC31 0 | 2230 = D51B 5
 140 = CA90 0 |  560 = FA20 0 |  980 = FA9E 7 | 1400 = ED0F C | 1820 = ED0F 5 | 2240 = FF3E 4
 150 = CDB9 A |  570 = 341B C |  990 = 2A10 3 | 1410 = 78AF 0 | 1830 = 77EB 7 | 2250 = 5958 4
 160 = 2C83 8 |  580 = C5F3 3 | 1000 = BC25 5 | 1420 = 12F9 1 | 1840 = B525 8 | 2260 = CCBE 8
 170 = 2CD5 B |  590 = 1B0D 2 | 1010 = 458C C | 1430 = 9684 1 | 1850 = EC10 D | 2270 = E01E 9
 180 = 4B77 B |  600 = C686 F | 1020 = 4B77 B | 1440 = ED0F 6 | 1860 = 548B 8 | 2280 = C401 B
 190 = CA90 B |  610 = 560F C | 1030 = 2A10 E | 1450 = 34CF 4 | 1870 = FC31 E | 2290 = 7A16 7
 200 =  815 0 |  620 = FD7E 2 | 1040 = BC25 0 | 1460 = 8D1A 5 | 1880 = ED0F A | 2300 = ED0F 9
 210 = 2C83 2 |  630 = 2C83 2 | 1050 = FA9E 8 | 1470 = D48B F | 1890 = 4A74 3 | 2310 = D8D9 6
 220 = CA90 2 |  640 = C711 5 | 1060 = ED0F F | 1480 = D23A 2 | 1900 = 14E2 D | 2320 = E01E B
 230 = CDB9 4 |  650 = 3377 6 | 1070 = BCDE C | 1490 = 3A85 A | 1910 = E361 6 | 2330 =  FD8 5
 240 = 2C83 5 |  660 = 5100 F | 1080 = DAD0 E | 1500 = 2364 D | 1920 = 6150 D | 2340 = D854 1
 250 = 1DC8 6 |  670 = B266 9 | 1090 = 1FBF 1 | 1510 = 4B77 4 | 1930 = FC31 3 | 2350 = 8A9D 9
 260 = 4BFC C |  680 =  AD1 1 | 1100 = 2C83 B | 1520 = 3A85 7 | 1940 = ED0F 5 | 2360 = 226C 3
 270 = 2C83 7 |  690 = ED0F E | 1110 = ED0F F | 1530 = 79BE 9 | 1950 = 3D76 1 | 2370 = BFBA 9
 280 = 4B8A F |  700 = 2DB7 0 | 1120 = C329 7 | 1540 = D23A C | 1960 = 660B 1 | 2380 = BFBA F
 290 = FD2E 0 |  710 = 48E8 5 | 1130 = FDA3 F | 1550 = 3E82 6 | 1970 = EC10 A | 2390 = 1FFB A
 300 = 40D7 1 |  720 = 18AD 3 | 1140 = 9684 2 | 1560 = 4B77 1 | 1980 = 95E7 E | 2400 = 561E 5
 310 = 8844 2 |  730 = 6420 2 | 1150 = ED0F 0 | 1570 = 3A85 4 | 1990 = FC31 3 | 2410 = 1FFB C
 320 = EC08 7 |  740 = 4047 7 | 1160 =  776 8 | 1580 = 1F04 7 | 2000 = ED0F D | 2420 = 561E F
 330 = BA62 A |  750 = F237 2 | 1170 = 8D1A 3 | 1590 = 4B77 2 | 2010 = 166C 4 | 2430 = 8D0A 8
 340 = A8DF F |  760 = 9924 A | 1180 = 80EB 0 | 1600 = D48B C | 2020 = 8FFE 0 | 2440 = 506B 2
 350 = 6D83 9 |  770 = 2C83 B | 1190 = D23A 8 | 1610 = 3E82 6 | 2030 = EC10 8 | 2450 = 911F 0
 360 = 4021 C |  780 = 619B 5 | 1200 = 3A85 8 | 1620 = 3A85 0 | 2040 = 440E 7 | 2460 = 7A16 3
 370 = 9EDF F |  790 = 2C68 2 | 1210 = 246A 9 | 1630 = 8D1A 6 | 2050 = FC31 5 | 2470 = 6563 5
 380 = 4354 7 |  800 = 6BA1 1 | 1220 = 4B77 3 | 1640 = ED0F 6 | 2060 = ED0F 8 | 2480 = 5869 3
 390 = 9B40 2 |  810 = 2C83 9 | 1230 = 3A85 0 | 1650 = 9784 F | 2070 = B70D 6 | 2490 = 41A1 2
 400 = 16E1 7 |  820 = 51F8 A | 1240 = 9BC9 F | 1660 = 8078 6 | 2080 = 9168 E | 2500 = 6739 B
 410 = A363 2 |  830 = DAD0 1 | 1250 = D23A 6 | 1670 = 1BA4 2 | 2090 = BFBA 0 | 2510 = ED0F A
 420 = 5341 A |  840 = 8E24 0 | 1260 = 3E82 6 | 1680 = 6D10 A | 2100 = 2529 5 |
```

Reach For The Sky

with GLIDER PILOT 2, our comprehensive flight simulator. Features cable launch, thermals, cross country with map and practice option. Extensively machine coded for quick response. Instruction booklet.

With full instrumentation and "solid" colour perspective graphics, this is not a game but an accurate and challenging simulation. Keys or potentiometer joystick. Find the thermals and soar!!

FREE to disc users – "NOTEBOOK" – an easy to use memopad utility. Use it as a flight log for Glider Pilot 2!
B, B+ and MASTER.
Cassette £7.95, 5.25" Disc £8.95, 3.5" Disc £9.95.

APEX Software, Station Road, Penshaw, Tyne & Wear DH4 7PE. Tel: Durham 091-385 3091.

Bradstreet Computer Centre Ltd.
(B.C.C. Ltd)

Our Services are available in the area N, NE and NW London, also Herts, Essex and Beds. While with the help of the Post Office and courier services, we intend to serve throughout the UK.

We offer the following:
- General advice of suitability and availability for domestic and business hardware and software. We will supply written estimates and quotes as required. Catalogues of material and services are in the course of preparation.
- Sales of all forms of electronic hardware, software and material, especially that offered by firms such as **Akhter Group plc, Slogger Ltd** and **Wyles of Wembley.**

· Services:
Design – Special purpose equipment and test equipment also printed circuits etc.
Computer aided – Circuit analysis, filter design and production evaluation.
Production – A limited prototype service is available.
Measurement – A measurement facility is available for the measurement of active and passive devices, components and equipment.

BRADSTREET COMPUTER CENTRE LTD
Four Hazels, Allard Way, Broxbourne, Herts. Tel: 0992 464248. Answerphone available

---

Carswell Computers

24 Elm Road, Faringdon, Oxon SN7 7EJ
Telephone (0367) 21153

TYPEASY Version 4
- Touch typing course for the BBC B, B+ Master & Electron
- Mistakes displayed with flashing letters
- Teaches correct finger movement
- 139 progressive exercises plus routines for writing more yourself
- Displays errors, speed and performance

disc (40 or 80 track) £15, Econet disc (80 track) £30, cassette £7.50

TYPE INVADERS
- Increases your speed – we guarantee!
- Letters and words rain down faster and faster – type correct letters to stop them
- 10 levels with 4 speeds plus colour and sound
- See review in Acorn User July '86

disc (40 or 80 track) £12.50, Econet (80 track) £25, cassette £7.50
Prices include P&P, please add 15% VAT

FREE

Deluxe 120 disk capacity lockable disk box worth over £14. (Please state if you want the100 capacity box instead)

School & Government Orders Welcome

ALSO FREE Thingi copy holder to all NEW customers (when you mention this ad.)

When you buy	25 disks for only £17.95	
or	50 disks for only £26.95	
or	100 disks for only £43.60	

All disks are Japanese Higrade 5.25 DS/DD certified. They come with hub rings, envelopes & labels, and a unique 5 year guarantee – Great Value!

FREE CATALOGUE WITH EVERY ORDER

Nebulae, Dept. M.I. FREEPOST, Kilroot Park
Industrial Estates, Carrickfergus, Co. Antrim,
BT38 7BR. Prices include VAT & Postage

7 Day Delivery
One year guarantee
& 14 day money back period

Tel: (09603) 51020

FREEPOST YOUR ORDER TODAY . NO STAMP REQUIRED

SNATCH A SCREEN AND . . . PRINT IT, SAVE IT, ENLARGE IT

SNATCH allows you to
1. print screens from most educational software
2. print both Teletext and Graphics screens
3. change the colours before printing
4. print all or part of a screen
5. print in two sizes (with some exceptions)
6. save your favourite screens to disc
7. display saved screens
8. enlarge saved screens for printing
9. enlarge saved screens and re-save them
10. change the colours of saved screens
11. use saved screens in art packages
12. print awkward dual-mode screens

To use **SNATCH** you need
An Acorn Master, Compact, 128K B
or a Model B fitted with 16K Sideways RAM
and either an Epson 9 or 24 pin printer
or an Integrex Colourjet printer.

Model B users:
if you have no Sideways RAM we can provide an easy-to-fit 16K SRAM block with full instructions. (Check for availability first)

SNATCH DISC ONLY £16.00 + VAT
SNATCH DISC + 16K SRAM £29.50 + VAT
price includes P&P on UK orders

PLUS . . .
Pixel Editor
for all
Graphics modes

PLEASE SUPPLY ME WITH
SNATCH ☐ SNATCH + SRAM ☐

NAME ____________________
ADDRESS ____________________
____
____
POST CODE __________ TEL NO __________
MACHINE TYPE __________ DISC SIZE __________
• Please remember to enclose cheque or L.E.A. order

• SEND TO:
4Mation Educational Resources
'Linden Lea'
Rock Park, Barnstaple
Devon. EX32 9AQ
Tel: 0271 45566
TTNS Box: 01:YNK045

BeebDOS version 2.01 — from MicroBoss

Software for BBC and IBM file interchange

Runs on IBM-PC-XT-AT or compatibles and supports DOS 2.0 or later
Supplied on 360K IBM diskette with manual and plastic wallet the software includes:

BCOPY	Copy files BBC – IBM, IBM – BBC, BBC – BBC (wild cards allowed)
BCONV	Flexible IBM file translate facility enabling text to be passed between VIEW, WORDSTAR and Displaywrite 3 amongst other uses.
BGRAPH	Display BBC mode 0,1,4,5 screen format (AMX Art included) files on IBM standard colour (CGA), enhanced colour (EGA) or Hercules screens for use in IBM PC presentation, DTP, drawing and other graphic applications.

BeebDOS is almost a complete BBC DFS/ADFS for the IBM PC with utilities to catalogue, format, backup, delete, lock, unlock, compact rename, alter title & options, map free space, change and create directories of BBC diskette/files.

In fact BeebDOS is probably the fastest and most powerful BBC/IBM PC file transfer method available and no cables or serial connections are required.

£46
Inclusive of VAT

BBC double density diskette formats supported are Acorn ADFS, Watford, Solidisk, OPUS DDOS and UDM. Acorn single density DFS is only supported when running BeebDOS on an IBM AT or XT286 with a 360k disk drive. Please send or phone for an information sheet

CHEQUE OR POSTAL ORDER TRADE/EDUCATION ENQUIRIES WELCOME
MICROBOSS LTD 3 HADLEIGH RD FRINTON ESSEX CO13 9HG TEL (0255) 671095

Field Electric Ltd Tel: 01-953 6009

3 Shenley Road, Borehamwood, Herts.
WD6 1AA. Fax: 01-207 6375

Official Orders. Overseas enquiries welcome. Order by phone or post. Open 6 Days. Postal rates apply U.K. Mainland only. All prices include 15% VAT. Phone your order for quick delivery with Access, Am/Ex, Diners or Visa Cards

5.25" Half height disk drives in case. New case size 12.25" x 9.5"x 2.5" 40 track double sided. **£46.00** c/p £2.50.

Tabor Corp: Disk drives. 3" new & boxed 34 way IDC edge pin connector . 360k 40 track . Data. **£24.00** c/p £2.00

MPI. Micro Peripherals inc 5.25" full height disc drives. 40 track single side. **£22.50** c/p £2.00.

Special Offer. NEC 12" green screen monitors. 75Ω composite video input. Black plastic case. High resolution. 240 VAC input. **£19.95** c/p £5.50
NEC 9" Green screen monitors 75Ω composite video input. Black plastic case with built in handle. **£19.95** c/p £4.50.

12" Green Screen Monitor new & boxed 75Ω composite video input. High resolution. **£59.95** c/p £5.75.

PC/XT & AT compatible keyboard. Auto-sense keyboard. Keys arranged in 3 areas. Function array. Qwerty array. Special function/number pad. Shielded 5' cable terminated to 5 pin Din. **£45.00** c/p £4.95. New and boxed.

We stock switch mode/linear PSU. Transformers test & measurement equipment. Audio equipment, telephone equipment. Please ring us. For overseas postal rates please enquire for quotation.

Colour screen dump needed

I HAVE been trying to dump a screen from software that has no facility within it. I need to do this to help a three-year-old boy who is seriously handicapped physically and unable to speak.

Even so, with the use of paddles through an ADC and specialist software he achieved some wonderful colour screen pictures. If these could be reproduced on his Epson EX800 colour printer they could be used to monitor his progress.

If you could offer any advice or guidance to help me solve this puzzle and help this courageous little lad advance as much as possible, then I could pass this on to his parents to give all fresh heart and renewed confidence for the challenges ahead. – **T.E. Mayell, Sidcup, Kent.**

● Assuming your software will actually save a screen, you can reload it when you want to print the picture. Has any reader got a suitable colour dump for this printer?

Splitting the port

I HAVE a Multiprom Eprom programmer and a mouse which both use the user port. I have to plug and unplug these items continuously and am afraid of eventual damage to the micro's pins. Can you suggest a way of connecting both at the same time – perhaps by switching one of the user port lines – or alternatively do you have a design for a splitter? – **D.J.L. van den Bergh, Johannesburg, South Africa.**

● Watford Electronics supply user port splitters for £22.

Compact capers

I READ with interest in the August issue your reply to H.D. Smith's request for a software solution to Control+Break to initialise roms.

I have a Master Compact, and use several rom images that require the above treatment to initialise them. So I thought great, I'll try your answer to the problem and include it in my !BOOT file after the loading of the rom images.

*This promptly caused what appeared to be a Control+Break, but removed all the rom images at the same time. Any normal star commands were rejected, and *ROMS revealed a lot of empty space where the images had once been. What you appear to have found with this command is a cold start up command – it wipes out everything. This in itself I have found to be useful as some commercial software does not leave the sideways ram the way it found it.*

So how about solving the original problem for rom initialisation: Is the Master Compact in some way different in this respect, or have you or I got it wrong? – **S.L. Uphill, Totton, Hants.**

● The method works perfectly on BBC Micros and Master 128s but on the Compact you don't need to use this dirty method anyway. You can force roms to initialise when you use the *SRLOAD command by adding the parameter I to the end. So you don't need to generate a hard break.

Book bonanza

MY 14-year-old son's school has just started introducing Archimedes A310s to pupils for Information Technology training, so he needs a user friendly book.

The standard reference manuals are too expensive and complicated, so please can you advise some suitable books? We have a BBC B which he uses for games and simple graphics. – **B.A. Brown, Eastleigh, Hants.**

● The problem with recommending books is that people are very different – what one person finds concise and informative another will find dry and dull. There are so many writing styles fom the American gee whizz to the English dry academic it is hard to choose.

You best bet is to go to a good bookshop, have a look at what they have on offer and see which suits you best.

It's also worth looking at The Complete BBC Computer User Handbook from Watford Electronics – it's reviewed on Page 51 of this issue.

Keep track of functions

I DO quite a bit of programming, and find it useful to know where the functions and procedures are defined within the listing. So I wrote a program that lists the line numbers of all the definitions.

Not satisfied with having to load a long index procedure into each program I write, I compacted the whole thing and put it on to a function key as follows:

```
*K.0 P=PA.:REP.:N=P?1*256
+P?2:P=P+3:REP.:P=P+1:U.?
P=221OR?P=13ORP>TOP:IF?P<
>221U.P>TOP EL.P=P+1:P.RI
."      "+STR$(N),5);" ";M.
"FNPROC",ABS(?P=242)*3,2+
ABS(?P=242)*2);:REP.:P=P+
1:VDU?P;:U.?P=13:P.:U.P>T
OP:M
```

The routine works by reading through the memory – beginning at PAGE – and recording each line number in the variable N.

It then reads through the line for the DEF token – &DD – and prints everything after it until it reaches a Return – CHR$13. It stops when it reaches TOP. – **Nicholas Sayers, Canterbury, Kent.**

Win a tenner

● **Want to write to The Micro User? The address is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

Writers of the most interesting letters receive a £10 prize.

£10 Prize letter

Pick up a new font

IF YOU have a copy of Zarch for your Archimedes you may have noticed the text font used to display things like scores. If you would like a copy of this font for your own use, this is how you get it:

☐ *Type in the FontSave program shown here and store it on a disc.*

☐ *Insert your Zarch disc.*

☐ *Kill off the SoundDMA module with *RMKILL SoundDMA.*

☐ *Type *RUN Zarch*

☐ *When the error appears change discs, type *MOUNT and run the FontSave program.*

☐ *Answer the prompts with the following:*

Filename: Chars
First character: 48
Last character: 126

After about 1.5 seconds a file containing currently defined text fonts will be

Turn to Page 128 ▶

◀ From Page 127

*saved to your disc. This is the Zarch font and to load it you need only type *PRINT Chars – or whatever you called it.*

Note that this is a normal text font and is different from the anti-aliased fonts used on the Welcome disc. These instructions assume the Arthur prompt is being used, not Basic or the Desktop. – **J. Horsnell, Manor Park, London.**

Setting markers

HERE is a routine for use in a Wordwise Plus segment which will surround the current paragraph with markers. To use it move the cursor to the paragraph to be marked and press Shift and the appropriate function key.

After a short delay markers will appear around the paragraph.

For this routine to work correctly paragraphs must have a blank line between them and should start with a TI5 command or similar.

```
A$=GLT$
DELETE MARKERS
.top
REPEAT
CURSOR AT 0
CURSOR UP
A%=ASC(GCT$)
UNTIL A%<65 OR A%>122
A%=ASC(GCT$)
IF A%<65 OR A%>122 THEN G
OTO marker
GOTO top
.marker
CURSOR AT 0
CURSOR UP
FKEY 3
.bottom
REPEAT
CURSOR AT 0
CURSOR DOWN
A%=ASC(GCT$)
UNTIL A%<65 OR A%>122
A%=ASC(GCT$)
IF A%<65 OR A%>122 THEN G
OTO marker2
GOTO bottom
.marker2
CURSOR AT 0
CURSOR UP
FKEY 3
CURSOR TOP
FIND A$
DISPLAY
```

– **Robert Smallshire, Cradley Heath, West Midlands.**

Econet improvement

REGULAR users of Econet know only too well how inconvenient it is when the micro defaults to DFS when you press Break. A solution lies in the eight option links on the lower right hand corner of the keyboard PCB.

The documentation says that only bits 0 to 5 are used. However when bit 7 is set on a machine with a DNFS the default filing system becomes the NFS.

Bit 7 is the link furthest away from the right hand side of the keyboard.

Before you get the soldering iron out it might be a good idea to check that this works with your version of the DNFS – it has been tested on the 3.60 issue. Type:

```
*FX255 127
```

When you press Break you should find that the network has been selected. This effect is cancelled by Control+Break but note that with this command the bits are inversed so it would appear that all but bit 7 are set. – **Andrew Fletcher, Abergavenny, Gwent.**

Elite gets frozen out

I HAVE access to two BBC B's and the only difference between them is that one has an Econet chip fitted.

When I load Elite on the micro without Econet it works fine, but if I try to load it on the other the screen freezes.

Could you please tell me if there is a way of disconnecting Econet without breaking into the micro? – **Andie Crossland, Crosby, Merseyside.**

● Although there is no way to disable Econet fully, you will probably find that if you enter:

```
?&224=&A6
```

before loading games they will work. You should use:

```
*EXEC !BOOT
```

to load the games, as Shift+Break would disable the patch.

No luck

*DO you have any details on how to implement the *VIEW, *REMOTE and *NOTIFY utilities on the Econet network – Filestore Level III – using Archimedes 310s? I have tried them all, under both the Arthur and the 6502 emulator without success.* – **John Reddy, Computer Sales Manager, The Educational Company of Ireland, Dublin.**

● Sorry, no idea. Can any reader help?

A fraction of the whole

WHEN you're using Wordwise or Mini Office II you sometimes need to print fractions. When you're in Mode 7 pressing the curly brackets and the back slash keys gives the fractions quarter, half and three quarters on the screen.

The following embedded commands added to the start of your word processor file will program Epson compatible printers to print out corresponding symbols. Owing to the small size the detail is restricted but the characters are recognisable. On Mini Office II use CC in place of *OC.*

```
OC27,58,0,0,0
OC27,38,0,92,92,139
OC0,1,2,244,8,16,43,80,133,8,1
OC27,38,0,123,123,139
OC0,1,2,244,8,18,36,74,21,2,0
OC27,38,0,125,125,139
OC136,1,170,84,8,18,36,74,21,2,0
OC27,37,1,0
```

– **A.S. Day, Leatherhead, Surrey.**

Moon Patrol mastered

I'VE typed in Moon Patrol from the October issue and it checks out perfectly with the checksums. But when I run it on my Master I get Syntax error at line 290. *Does this program work on the Master?* – **J.Gower, London.**

● It does work on the Master, but you need to set PAGE=&1900 before running it. The best way to do this – if you're using discs – is to add a line at the start of Patrol:

```
      1 IF PAGE<>&1900 THEN
 PAGE=&1900:CHAIN"PATROL"
```

Tape users have a choice: You can either always remember to type PAGE=&1900, or have a little program on the tape just before PATROL called MoonPatrol:

```
10 PAGE=&1900
20 CHAIN"PATROL"
```

Then just CHAIN"MoonPatrol" to play the game.

ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

Comms international

MY brother, who lives in Italy, has an Amstrad PCW8256 which uses 3in discs and I *have a Master 128 with a 5.25in disc drive. Is there any hardware or software which either one of us could use to enable us to communicate by text on disc?* – **H.W. Kennett, Sheerness, Kent.**

● You have both hardware and software problems: Both the disc sizes and formats are different. Although not impossible, it would take a lot of work to sort the situation out. Apart from that there's the time delay while it's in the post.

A better solution is for you both to get modems and communicate electronically using a system like MicroLink.

Saving pictures

I AM puzzled by the Timpaint art program on the Master Welcome disc. I have tried saving pictures, but all it does is bring up the Disc changed *error message. I think this is because I need to type:*

```
*MOUNT 0
```

to use my own discs. But I must do this before I load my Welcome Disc, so when I load that the effect of the command is erased.

Could you please suggest a way to save the pictures? – **Simon Khoury (age 10), BFPO 39.**

● You should be able to copy the art program to your own disc and save the screens on the same one. That would eliminate the need for disc changing.

£10 Prize letter

High priority problem

ON the ATPL Sidewise board the sideways ram is located at position 15 – the highest priority socket. Any language rom image in this position will assume control at switch-on and this can sometimes be a nuisance.

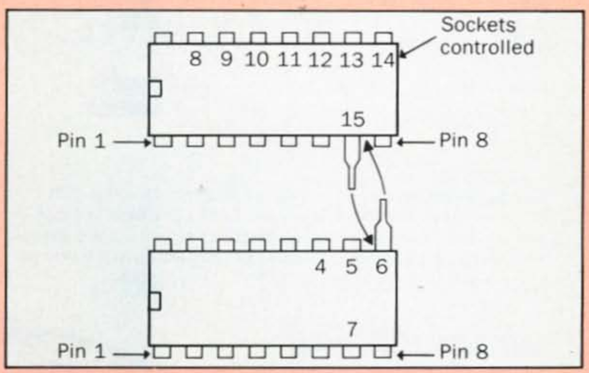
There's a simple modification you can do which will change the priority of the sockets.

Each output pin of IC1 and IC2 – 74LS138 – selects a socket on the board and only one of these can be selected at a time. Sockets 15a and 15b are treated as one and selected by pin 7 of IC1.

The numbers in the diagram here indicate the socket which each output controls and to change the order or priority is simply a matter of swapping two of these connections.

To swap sockets 15 and 6, for instance, simply lift pin 7 – selects rom 15 – of IC1 and pin 9 – selects rom 6 – of IC2 out of their IC sockets.

Solder a short wire to each pin and insert the opposite end into the IC socket position for the other pin. Ensure that there are no short circuits.



74LS138 IC modifications on ATPL board. These ics are normally in DIL sockets

Sockets 15a and 15b now become 6a and 6b while socket 6 changes to 15.

Rom images can still be loaded by:

```
*LOAD <filename> 8000
```

as before. A switch may be connected to the link position S6 to prevent writing to the ram.

In the absence of any other method, the ram can be cleared by using a file full of &FF from disc. Run the following program:

```
10 FORX%=&3000TO&7000STEP4
20 !X%=&FFFFFFFF:NEXT
30 *SAVE BLANKS 3000 7000
```

Now the ram may be blanked by typing:

```
*LOAD BLANKS 8000
```

– **Martin Pickering, Sandbach, Cheshire.**

Spare page of memory

ACORN has cheated Basic users out of a page of memory and as, far as I know, no one has mentioned it before. I'm referring to the page at &700 which is only used by Basic in immediate mode for editing programs, sending OS calls from the keyboard, and the like.

Once in a running program this is a very useful spare page of memory for assembling short bits of code, indirection string workspace and even high score tables in games.

I've made frequent use of this on programs that run on everything from an Electron to a Master Turbo. If you are very careful and don't use CALL with parameters, you can also use the page at &600.

Finally, if you want to be really naughty you can handle any resident integer – @%-Z% – directly, bearing in mind that the memory location of the four bytes of the integer can be calculated from:

```
&400+(ASC"char"-64)*4
```

where char *is the integer you want to use.*

This makes for very quick – albeit dirty – parameter passing from Basic to machine code and vice-versa, and is useful for finding high byte and low byte values much faster than MOD and DIV. – **Terry Blunt, Crowthorne, Berks.**

Vuppy re-visited

I APPRECIATED Peter Harris's article on the Vuppy View printer driver in the September 1988 issue of The Micro User *but there's a slight problem that can be easily solved.*

My printer is set to auto feed but when I used the driver I found I was getting an extra line feed for every one intended.

Removing the lines LDA#10 and JSR oswrchr from the printer driver program eliminated the extra feeds and the driver now works very well.

While on the subject of View, readers may be interested to note that other files – including those created on other word processors and spooled Basic listings – can be loaded into View for later editing by using the READ command. – **George McGrattan, Ardrossan, Ayrs.**

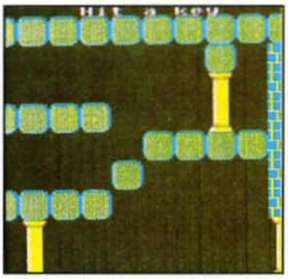
Finding the quest

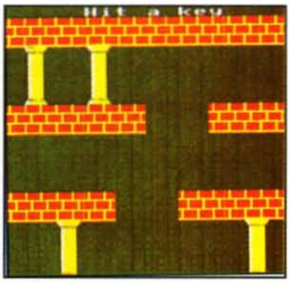
IN the October issue of The Micro User there's a review of our adventure the Taroda Scheme. Unfortunately the supplier mentioned, Pres, only provides the Electron version, not the one for the BBC Micro.

To get this version please contact Heyley Software direct on 061-427 5266. – **Hugh Roberts, Heyley Software, 24 Ley Hey Road, Marple, Stockport, SK6 6QP.**

Write your own arcade smashes using the

ARCADE GAME *Creator*





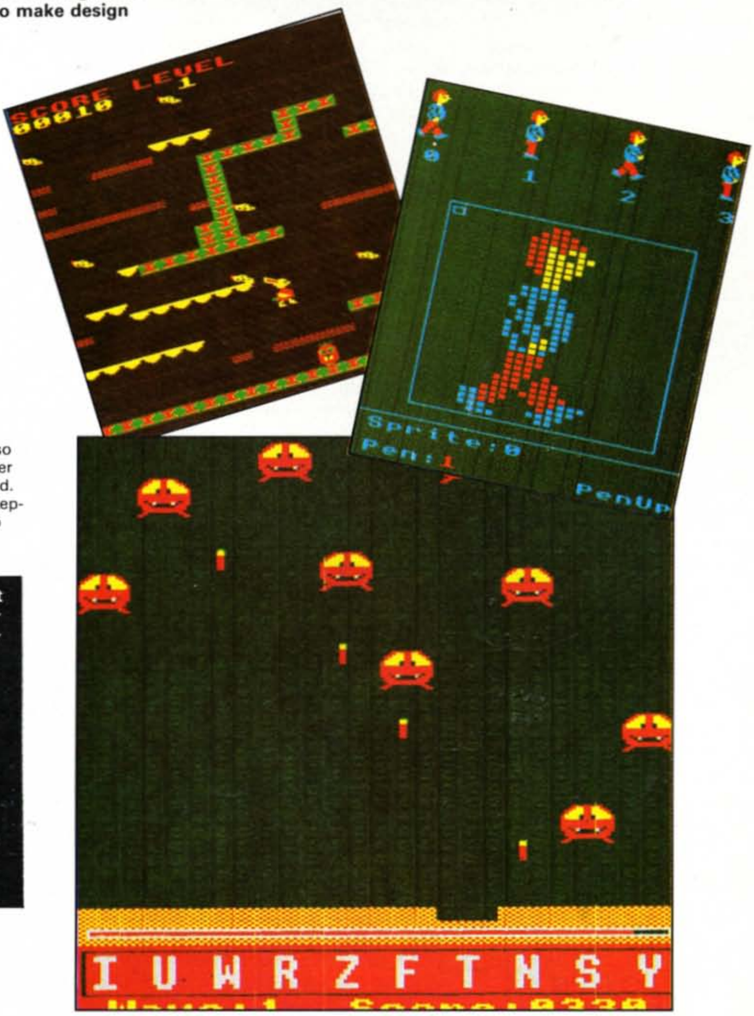
Arcade Game Creator is a suite of programs for the BBC Micro or Electron. Taken from the pages of *Electron User,* it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

- A Mode 5 sprite editor for designing your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines.

. . . and much, much more.

To accompany the Arcade Game Creator we are also making available the six back issues of Electron User (February to July 1988) in which the series appeared. Clearly written without any jargon, they take you step-by-step from the basics of game design, right up to producing fully-fledged programs.



If you thought Electron programs would not work correctly on a BBC Micro, you're in for a surprise. In addition to the Arcade Creator suite of programs, all the following programs in the *Electron User* bundle will also work on your BBC Micro.

Features: Printer benchmark test, using View for Programming, Pascal tutorial, a home brew kit, Viewsheet tutorial, machine code beginners' tutorial, entertaining 10-Liner programs, Rainbow art package, machine code maths routines and a car route database.

Arcade games: Randall Rabbit, Bomb Alert, Navigator, Super Digga, Shove Penny, Go Pig and Keyboard Gremlins.

Educational games: Odd One Out, Hiss, Dozer, Disorder, Lion's Lair and Tilley the Train.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!

Arcade Game Creator

Tape + magazine bundle	**£9.95**
Disc + magazine bundle	**£10.95**

The *Micro User* team has been through all these programs in detail, ensuring they work correctly and make the best use of the BBC Micro's greater power.

TO ORDER PLEASE USE THE FORM ON PAGE 135

Learning CAN be fun

- Use your BBC Micro or Master to teach and amuse your children at the same time.
- Three packages crammed full of educational programs – and so easy to use!
- Each program has been educationally approved after extensive testing in the classroom.

Reduced prices!
£3.95 tape
£4.95 5¼" disc
£6.95 3½" disc

FUN SCHOOL!
10
programs for 8-12 year olds
BBC Micro & Electron
UN
OOL!
BBC Micro & Electron
programs for 5-8 year olds
BBC Micro & Electron

B+ ✓
M ✓

Ages 2-5

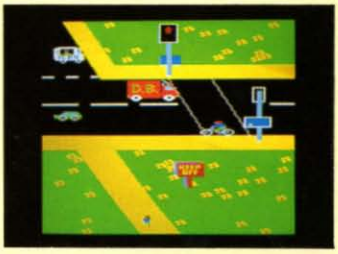
- Alphabet
- Colours
- Counting
- House
- Magic Garden
- Matchmaker
- Numbers
- Pelican
- Seaside
- Snap

Ages 5-8

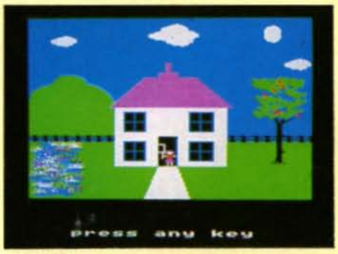
- Balance
- Castle
- Derrick
- Fred's Words
- Hilo
- Maths Test
- Mouser
- Number Signs
- Seawall
- Super Spell

Ages 8-12

- Anagram
- Codebreaker
- Dog Duck Corn
- Guessing
- Hangman
- Maths Hike
- Nim
- Odd Man Out
- Pelmanism
- Towers of Hanoi

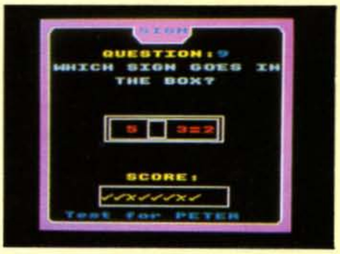


PELICAN
Teach your children to cross the road safely at a Pelican crossing



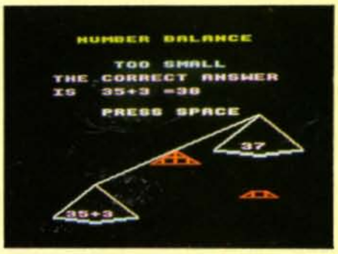
press any key

HOUSE
Select the colours to draw a house – hours of creative entertainment



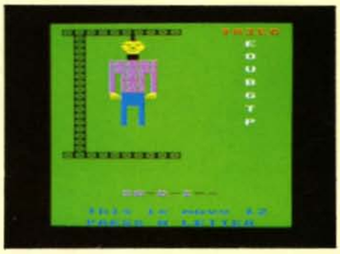
SIGN
QUESTION: 9
WHICH SIGN GOES IN THE BOX?
5 □ 3=2
SCORE:
✓✓✗✓✓✓✗✓
Test for PETER

NUMBER SIGNS
Provide the correct arithmetic sign and aim to score ten out of ten

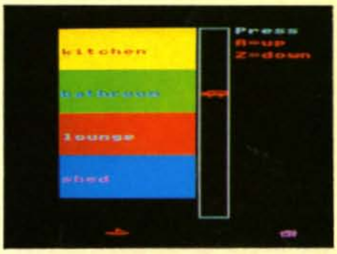


NUMBER BALANCE
TOO SMALL
THE CORRECT ANSWER IS 35+3 =38
PRESS SPACE
37
35+3

BALANCE
Learn maths the fun way. Type in the answer to balance the scales



HANGMAN
Improve your child's spelling with this fun version of the popular game



Press
A=up
Z=down
kitchen
bathroom
lounge
shed

ODD MAN OUT
Find the word that does not fit – before your time runs out

TO ORDER PLEASE USE THE FORM ON PAGE 135

4 exciting compilations of the very best programs from the pages of *The Micro User*

TEN of the BEST!

We've brought together the most popular listings which have been published over the last year and created four packages each devoted to a particular subject area. There's entertaining games, handy utilities, clever graphics utilities and powerful ram and disc utilities – all ready for you to put to use without the need for any typing in! You can also list and adapt nearly all the programs – an excellent way to improve your programming skills.

Ten of the Best Ram and Disc Utilities

B+✓ M✓

Ram Arrays – Extend the memory available for your arrays in Basic.
Printer Buffer – No more waiting for your printer to finish printing with this great utility.
Prommer – Put your own Basic programs in rom for instant access.
Disabler – Having problems with duplicate rom commands? Cancel out roms with this utility.
MOT – Keep your discs in top magnetic condition and rescue corrupted programs.
Disc Copy – No more single file copies - this utility makes use of the whole memory.
Disc Catalog – Keep track of your disc files with this excellent cataloguing program.
Disc Protect – Professional disc protection is yours using this excellent utility.
Dual Catalog – Get 56 files on one disc surface with this utility.
Safe Save – Prevent overwriting a backup file with this clever checking routine.

Disc price: £4.95

Ten of the Best Graphics Utilities

MicroWorks – Create impressive Mode 4 screens with this superb graphics program.
Pixel Editor – Fine-tune screen pictures in any mode with this excellent editor.
Flood Fill – Fill screen areas with solid colour at remarkable speed.
Mode 7 Dump – Print out your Mode 7 screens onto any Epson-compatible printer.
Slim Characters – Get 40 characters per line in Modes 2 and 5.
Special Fonts – Display 192 fonts on screen with this easy-to-use utility.
Printer Control – Modify your printer styles easily from your wordprocessor.
Dual Screens – Give your programs the professional look with this double-screen display.
Characters – Create your own character sets with this useful utility.
Charprint – Use this clever routine to print your own character sets to Epson printers.

B+✓ M✗

Disc price: £4.95

***Buy all four discs for* £17.80 *and save* £2!**

Ten of the Best Games

B+✓ M✓

Dino – Ride the gobblosaurus past all the perils in this magnificent fast-action game.
Hunkie Egg – Clamber up the ladders and run along the levels to gather up the eggs.
Diamond Quest – Collect all the diamonds in this superb arcade adventure.
Stellar Rescue – Defeat the powerful gravity to land your spacecraft in one piece.
Fruit Machine – Test your skill and luck on the one-armed bandit with this addictive simulation.
Karate Warrior – Delve into the mysteries of the martial arts as you aim to get a black belt.
Maltese Cross – Try your hand against the computer in this classic domino game.
Othello – Entertain yourself for hours with this very popular oriental board game on your micro.
Witch Hunt – Help Olive search the maze to find the 42 keys of Transportal.
Soccer Manager – Take on the soccer club's top job in this gripping game of skill.

Disc price: £4.95
(Also available on tape for only ***£3.95****)*

Ten of the Best Utilities

Text Compressor – Use this excellent utility to reduce the space held by your strings.
Variable Compressor – Reduce the size of your variables automatically to save space and improve speed.
Line Compressor – Save space in your programs by creating multi-statement lines.
BOS Editor – Make editing your Basic program easy with this on-screen editor.
Basdat – Convert disc files into Basic data statements and add the resultant lines automatically.
Basic Repairer – Rescue your programs after the Bad program error with this useful little utility.
Line Editor – Use a single-line word processor in your INPUT statements without changing your programs.
Circles – Use this fast and powerful routine to quickly draw filled and unfilled circles.
Events – Make your programs respond to real-time events with interrupt-driven Basic routines.
Stripper – Remove the line numbers from your Basic programs to allow editing within a word processor.

Disc price: £4.95

B+✓ M✗

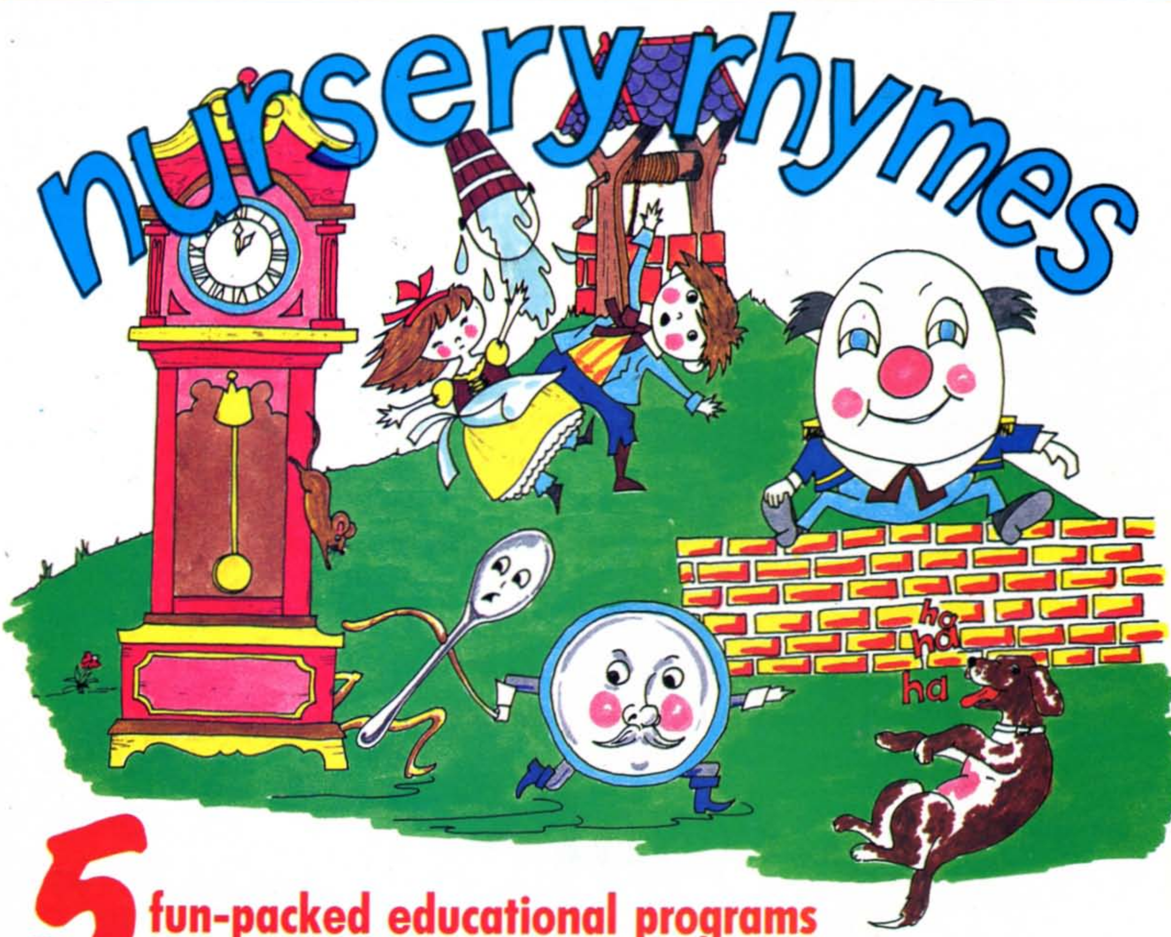
PLUS

Every package comes with an easy-to-use machine code version of the Get It Right checksum to enable you to check listings you've typed in.

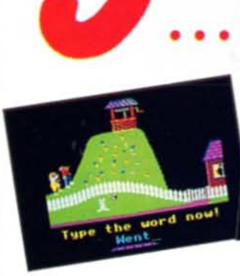
At only £4.95 each the Ten of the Best compilations represent superb value for money. But you can obtain all four for £17.80 and save £2!

Don't delay – turn to the order form on page 135 to take advantage of this excellent offer.

nursery rhymes



5 fun-packed educational programs ... for young children everywhere



What's the time?

This delightful collection of programs is based around children's favourite Nursery Rhymes. There's plenty of sparkling colour, sound and captivating animation to keep them riveted – and as they play they'll be learning all the way.

★ Tell the time with Hickory Dickory Dock.
★ Assemble the jigsaw in Humpty Dumpty.
★ Learn to spell with Jack and Jill.
★ Match the animals in See Saw Marjory Daw.
★ Play an exciting game in Hey Diddle Diddle.

Children from two to nine will be entertained for hours with these interactive programs. Don't miss out on this beautiful gift for your family – and at a very special price.

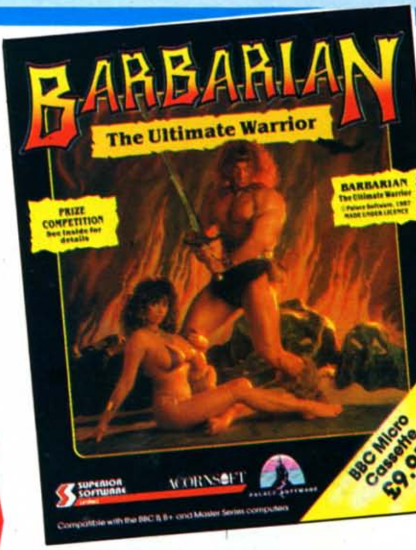
ONLY £5.95 (cassette)
£6.95 (5¼" disc)
£7.95 (3½" disc)

Suitable for BBC Micro, B+, Master and Master Compact

TO ORDER PLEASE USE THE FORM ON PAGE 135

Only £1.99 each!

FOR THIS


BARBARIAN
The Ultimate Warrior
PRIZE COMPETITION See inside for details
BARBARIAN The Ultimate Warrior © Palace Software, 1987 MADE UNDER LICENCE
BBC Micro Cassette £9.95
SUPERIOR SOFTWARE
ACORNSOFT
PALACE SOFTWARE
Compatible with the BBC B, B+ and Master Series computers

Usual price:

£9.95 (tape)	£11.95 (5¼" disc)	£14.95 (3½" disc)

Also available without subscription at £3 off the normal retail price

Our price £1.99

Barbarian is one of the most realistic and exciting of sword-fighting games ever written for the BBC Micro.

The scenario: The evil sorcerer Drax has abducted the beautiful Princess Mariana to satiate his nefarious desires.

A powerful warrior is sought out to vanquish Drax's demonic guardians and free the princess. You are that warrior – a mighty barbarian weilding your broadsword with deadly skill. Can you succeed in your mission?

This action-packed game is guaranteed to provide hours of intense excitement, and for only £1.99 with a subscription, it is an offer you should not miss!

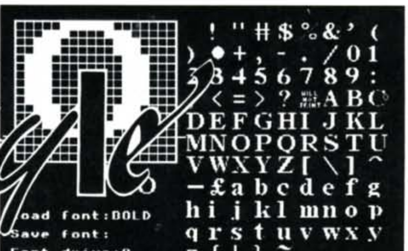
AND THIS

FontStyle

FontStyle is one of the most popular offers we have had in *The Micro User,* and now it is even more value for money.

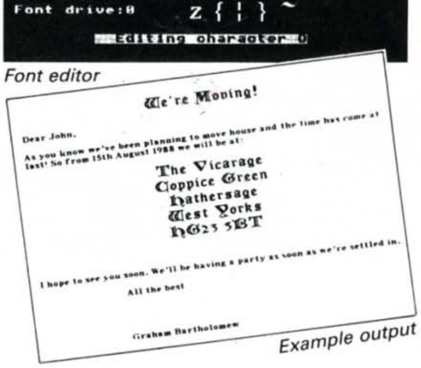
The program lets you design your own stylish fonts with ease. Then type your text using your favourite word processor, add the simple codes and print out on any Epson-compatible printer using the Fontstyle Print program.

With two fonts provided to get you going, and at the really remarkable price of only £1.99 with a subscription, FontStyle is the ideal way to produce professional quality printouts on your BBC Micro!



```
oad font:BOLD
Save font:
Font drive:0
Editing character
```

Font editor



We're Moving!

Dear John,

As you know we've been planning to move house and the time has come at last! So from 15th August 1988 we will be at:

The Vicarage
Coppice Green
Hathersage
West Yorks
HG23 5BT

I hope to see you soon. We'll be having a party as soon as we're settled in.

All the best

Graham Bartholomew

Example output

Usual price:

£8.95 (tape)	£9.95 (5¼" disc)	£10.95 (3½" disc)

Also available without subscription

Our price £1.99

...when you take out a subscription

Note: Current subscribers may renew their subscriptions early to take advantage of this special offer.

TO ORDER PLEASE USE THE FORM OPPOSITE

THE MICRO USER

MAIL ORDER OFFERS ORDER FORM

Valid to November 30, 1988. Overseas orders sent Airmail. Orders subject to availability. Please tick items in boxes below

£ p

Annual subscriptions *(see page 91)*

Magazine

		New		Renewal
UK £18	2001	☐	2002	☐
Europe (incl Eire) : Surface £28	2365	☐	2114	☐
Overseas Surface £34	2366	☐	2367	☐
Overseas Air £45	2004	☐	2113	☐

Commence with ________________ issue

Cassette and disc

B+ ✓ | M ✓

		New		Renewal
BBC 'B' cassette £25	2005	☐	2009	☐
5.25" disc 40T£40	2006	☐	2010	☐
5.25" disc 80T£40	2007	☐	2111	☐

Commence with ________________ (state month)

Add £10 for Europe and Eire/Overseas

Cassette/disc and magazine

(UK only)

BBC 'B' cassette + magazine	£35	2005/2001	☐
5.25" disc 40T + magazine	£50	2006/2001	☐
5.25" disc 80T + magazine	£50	2007/2001	☐

Commence with ________________ (state month)

Get any of these for only **£1.99** each when you subscribe (maximum two items per subscription)

NEW

Fontstyle cassette	2170	☐
Fontstyle 5.25" disc	2171	☐
Fontstyle 3.5" disc	2172	☐
Barbarian cassette	2173	☐
Barbarian 5.25" disc	2174	☐
Barbarian 3.5" disc	2175	☐

Fontstyle *(see page 68)*

B+ ✓ | M ✓

Cassette	£8.95	2107	☐
5.25" disc	£9.95	2108	☐
3.5" disc	£10.95	2109	☐

BBC Link II

NEW

Z88 eprom, BBC Micro disc and lead	£34.95	2179	☐
Z88 eprom, and BBC Micro disc	£28.95	2180	☐

Arcade Game Creator

NEW

(see page 130)

Cassette + Pack of 6 magazines	£9.95	2167	☐
5.25" disc 40T + Pack of 6 magazines	£10.95	2168	☐

Add £4 for Europe and Eire, £10 for Overseas

Barbarian *(see opposite page)*

NEW

B+ ✓ | M ✓

Cassette	£6.95	2176	☐
5.25" disc	£8.95	2177	☐
3.5" disc	£11.95	2178	☐

The Sound Master

B+ ✓ | M ✓

£14.99 2083 ☐

Add £2 for Europe and Eire, £7 for Overseas

Acornsoft Specials

Language Roms

B+ ✓ | M ✓*

BCPL Bundle £29.95 2045 ☐

* Not ADFS

Add £5 for Europe and Eire, £19 for Overseas

Forth £19.95 2046 ☐

Add £2 for Europe and Eire,/Overseas

Logo *(see page 70)* £19.95 2047 ☐

Add £4 for Europe and Eire, £15 for Overseas

Education

B+ ✓ | M ✗

ABC, Workshop, Talkback and Spooky Manor (four cassettes) £9.95 2048 ☐

Add £4 for Europe and Eire, £7 for Overseas

Games

B+ ✓ | M ✗

Revs, Revs 4 Track and Aviator (3 cassettes) £9.95 2050 ☐

Add £4 for Europe and Eire, £7 for Overseas

Micro User back issues

UK£1.75
Europe and Eire £2.25
Overseas£3.75

January 1988	2510	☐	June 1988	2515	☐
February 1988	2511	☐	July 1988	2516	☐
March 1988	2512	☐	August 1988	2517	☐
April 1988	2513	☐	September 1988	2518	☐
May 1988	2514	☐	October 1988	2519	☐

Monthly cassettes/discs

B+ ✓ | M ✓

			BBC B Tape £3.95	5.25" disc 40 track £4.95	5.25" disc 80 track £4.95	3.5" disc £7.75
Barny Bee	Jan	2608/11	☐	☐	☐	☐
Pinball	Feb	2612/15	☐	☐	☐	☐
Pipeline	Mar	2616/19	☐	☐	☐	☐
Darts	Apr	2620/23	☐	☐	☐	☐
Chinese Chess	May	2624/27	☐	☐	☐	☐
Beastiroids	June	2628/31	☐	☐	☐	☐
Halma	July	2632/35	☐	☐	☐	☐
Treasure Trail	Aug	2636/39	☐	☐	☐	☐
Bertha	Sept	2640/43	☐	☐	☐	☐
Moon Patrol	Oct	2644/47	☐	☐	☐	☐
Space Escape	Nov	2648/51	☐	☐	☐	☐

Ten of the Best *(see page 132)*

Games

B+ ✓ | M ✓

Cassette	£3.95	2131	☐
5.25" Disc 40T	£4.95	2132	☐
5.25" Disc 80T	£4.95	2133	☐

Basic Utilities

B+ ✓ | M ✗

5.25" Disc 40T	£4.95	2134	☐
5.25" Disc 80T	£4.95	2135	☐

Graphic Utilities

B+ ✓ | M ✗

5.25" Disc 40T	£4.95	2136	☐
5.25" Disc 80T	£4.95	2137	☐

Ram and Disc Utilities

B+ ✓ | M ✓

5.25" Disc 40T	£4.95	2138	☐
5.25" Disc 80T	£4.95	2139	☐

All Four Discs

5.25" Disc 40T	£17.80	2104	☐
5.25" Disc 80T	£17.80	2105	☐

Ten of the Best Educational Programs

NEW

(see page 114)

Cassette	£5.95	2179	☐
5.25" Disc 40T	£6.95	2180	☐
5.25" Disc 80T	£6.95	2189	☐

Books

NEW

The Complete BBC Computer User Handbook	£14.95	2163	☐
Advanced Reference Manual for the BBC Master	£16.95	2164	☐
Master Operating System and 5.25" disc	£15.95	2165	☐
Master Operating System and 3.5" disc	£16.95	2166	☐

Add £2 for Europe and Eire, £5 for Overseas per book

Morley Teletext Adapter *(see page 64)*

B+ ✓ | M ✓

Teletext Adapter (40T utilities disc) + Design 7 Plus	£99.95	2157	☐
Teletext Adapter (80T utilities disc) + Design 7 Plus	£99.95	2158	☐
Power Supply	£9.95	2054	☐

Add £4 for Europe and Eire, £7 for Overseas

Knitwear Designer

B+ ✓ | M ✓

BBC 'B' Cassette	£8.95	2031	☐
5.25" Disc	£9.95	2032	☐
3.5" Disc	£10.95	2051	☐

Add £2 for Europe and Eire, £5 for Overseas

Nursery Rhymes

(see page 133)

B+ ✓ | M ✓

BBC 'B' cassette	£5.95	2070	☐
5.25" disc 40T	£6.95	2071	☐
5.25" disc 80T	£6.95	2072	☐
3.5" disc	£7.95	2073	☐

Mini Office II

(see page 58)

B+ ✓ | M ✓

BBC B, B+	Cassette	£14.95	2368	☐
	5.25" disc 40T	£16.95	2369	☐
	5.25" disc 80T	£16.95	2370	☐
BBC Master	5.25" disc 80T	£19.95	2028	☐
BBC Master Compact	3.5" disc	£21.95	2029	☐

Add £2 for Europe and Eire, £5 for Overseas

Fun School *(see page 131)*

B+ ✓ | M ✓

		BBC B Tape £3.95	5.25" disc 40 track £4.95	5.25" disc 80 track £4.95	3.5" disc £6.95		5.25" disc Master £4.95
Age 2-5	2338/41	☐	☐	☐	☐	2076	☐
Age 5-8	2342/45	☐	☐	☐	☐	2077	☐
Age 8-12	2346/49	☐	☐	☐	☐	2078	☐

Disc Storage Box

(see page 69)

(holds up to 60 5.25" discs) £4.95 2052 ☐

Micro User Binders *(see page 69)*

Add £4 Europe and Eire, £6 for Overseas £4.95 2221 ☐

Dust Covers

(see page 69)

BBC B & B+	£3.95	2220	☐
BBC Master	£3.95	2222	☐
BBC Master Compact	£3.95	2224	☐

Readers in Europe and Eire/Overseas add £1 per item unless otherwise indicated

Don't forget to fill in your name and address overleaf.

TOTAL ______

Payment: please indicate method (✓)

☐ Access/Mastercharge/Eurocard/Barclaycard/Visa

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

☐ Cheque made payable to Database Publications Ltd.

Expiry Date ☐/☐

BLOCK CAPITALS PLEASE

Name____________________

Address____________________

____

____

__________ Post Code__________

Tel: ____________________

Signed____________________

Please allow 28 days for delivery

You can also order by phone, Prestel or MicroLink/Telecom Gold

- Any of the goods listed here can be ordered by telephone.
- Micronet subscribers and other users of Prestel can also use the Prestel mailbox.
- MicroLink subscribers and other users of Telecom Gold can also use the MicroLink mailbox.

Orders: 0625 879920
24 hours
Enquiries: 0625 879940
9am-5pm.

Prestel
Key Page 89, then send your order to:
614568383
24 hours

MicroLink/Telecom Gold
72:MAG001
24 hours

Fax Orders
0625 879966
24 hours

Don't forget to quote your credit card number AND your full address.

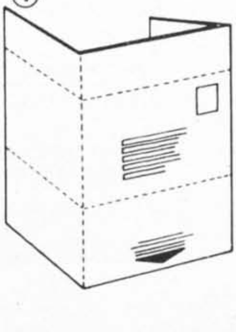
TUCK INTO FLAP

Don't forget to provide: Your address, your cheque/credit card No.
If you've ordered discs have you indicated which format?

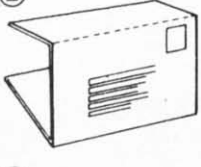
The Micro User
FREEPOST
Macclesfield
Cheshire
SK10 4YB

NO
POSTAGE
NEEDED
(IF POSTED IN UK)

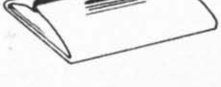
①



②



③



KOSMOS
S·O·F·T·W·A·R·E

Whatever your subject

French, First Aid, Football, Spelling, Science, Spanish, Sport, Scotland, England, English Words, German, General Knowledge, Geography, Italian, Arithmetic, Natural History and Welsh

Let your computer
help you learn

Write or phone for a FREE 20 page illustrated catalogue of our Leisure and Educational Software

KOSMOS SOFTWARE LIMITED
FREEPOST (no stamp needed)
DUNSTABLE, Beds. LU5 6BR
Tel 05255 3942 or 5406

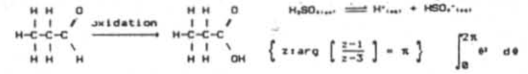
Sciways for Scientists

- Over 350 defined characters accessible with simple 2-key codes
- All characters printable on both screen and printer
- User defined characters can be stored on disc
- All facilities can be used with word processors or with BASIC
- Tested with BASIC I & II, Wordwise, Wordwise Plus, View 2.1, View 3.0, on the Master 128, B+ & Model B, and with Epson/compatible printers

GREEK ALPHABET: Upper and Lower case, upright and italic

Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω

SCIENTIFIC CHARACTERS: Mainly mathematical but also chemical symbols



Orders accepted from schools, colleges, establishments, etc.
Private orders – cheque with order, please

PRICE £39.95 inc VAT, p&p
16k ROM, 40/80 disc & manual
(not compatible with Inter-Word)

Mayhew Telonics,
376a Ringwood Road,
Poole, Dorset BH12 3LT
Tel: (0202) 747695

EUROWORD

for WORDWISE and WORDWISE PLUS

Converts Wordwise to a European Wordprocessor

- On-Screen Accents
- On-Screen Underlining
- Menu to Set Preferences
- Customise to Printer
- 40 Page Manual

Provides a minimum of 26 European Characters, all of which can be used in a single document.

Printer drivers for Epson, Citizen, Diablo/Qume, Juki, Ricoh and IBM mode printers.

Other useful features, such as additional embedded commands for Wordwise similar to those in Wordwise Plus.

Charm Micro Soft
31 Freshmeadow Lane, Helsby,
Cheshire WA6 0QU. Tel: 0772-616705

Price:£14.90 inclusive
Add £2 for a 3.5" disc
Specify 40/80T and printer type

MICROLEDGER

A high quality general ledger package designed by a Chartered Accountant for maximum versatility and ease of use. Ideal for small businesses, clubs, schools etc., as well as for home accounts. Runs on all BBC micros with 32k RAM or more. Features include:

☆ "Double-entry" accounting.
☆ Up to 99 general ledger accounts: all account names user-specified– can include VAT and sales/purchase ledger accounts.
☆ Up to 500 transactions per accounting period.
☆ Excellent budgeting facility.
☆ Reports include Income & Expenditure Account, Balance Sheet, Funds Flow Statement. Current period and year-to-date reporting with actual/budget comparisons. Full audit trail.
☆ Consolidation of two or more separate ledgers.
☆ Menu-driven with full prompt messages.
☆ Comprehensive, 30 page manual.

MicroLedger is supplied on 40 track 5.25" disk or on tape cassette for conversion to other disk media. Unrivalled value at **£16.50 (incl. p&p)** for disk or tape–specify which is required. Send cheque with order to **Ixchel Software, 16 Meredith Road, London SW13 0DY; or 'phone 01-876 9732 for a free fact sheet.**

Mijas Software
Bringing the new software world to YOUR BBC Micro

First with a
Relocatable Assembler and Linker
first with Source-Level Debug.
Now bring you a New 'C' Compiler.

Updated ! Exciting ! Fast ! 'C' Compiler

A NEW Software system
for real pperformance and productivity
on YOUR BBC MICRO.

Use it for games
buisness or industrial software.
Ideal for learning structured
programming and compiler techniques.

New version 1.5
compiles faster, runs faster
and even easier to use
on ANY BBC B or Master.

Written in 'C' itself for speed and portability

FULL SOURCE–CODE of the 'C' Compiler
and libraries with EVERY COPY. Can be modified
and re–compiled on any BBC 'B' or MASTER.

Small 'C' v 1.5

A true compiler. Does not use p-code
Full Source-Level Debug
Full I/O and C libraries
Separately compilable source-files
Produces 'stand-alone' programs of minimum size
Full support of BBC Graphics
Screen Mode may be changed at any time.
40+K of Program space even without overlays

Shell ROM image provided giving a 'MAKE' facility.
Use any editor, a simple line editor is included.

Write your own BASIC, PASCAL FORTRAN
or Artificial Intelligence Compiler using this 'C' system

Complete System including Assembler
Linker, Debug, Shell and utilities
in ROM Image format on disk

Access
ACCESS welcome

£50

Ready-blown EPROMS
£7.50 each,set of 4 £25

From:– Mijas Software,Mijas,Winchester Rd.
Michedever,Hants SO21 3DG
Tel 0962 89 352

Official orders welcome from educational establishments

Dave's been down–under!

Unfortunately, they sent him back. His father did all he could, but to no avail. Apparently David was beating the Aussies at "Hopper" (as well as cricket) and they didn't like it. Anyway, he's back, so if you come to see our full range of BBC software and hardware, disc drives, printers, monitors, cables etc, and you hear an Australian accent, it will only be David showing off. Actually, he sounds better than he used to!

NUMBER ONE IN BROMLEY

Data Store

6 Chatterton Road, Bromley, Kent. Tel.: 01-460 8991

The *Money-Wise* Accounts System makes others seem like hard work . . .

- **Quick** and **easy-to-use – minimum typing** and **no paper work** to do.
- Automatic **sort** & **error check.** Enter transactions in **any order.**
- Provides **instant information** on your banking, cash flow, sales, purchases, expenses, VAT and thousands of your transactions.
- Shows your **turnover,** calculates your **net profit,** lists **debtors** and **creditors** and provides all the figures for the **VAT returns** and year end **accounts.** Each selected by a **single key-press** from a **menu.**
- Handles **standing orders, late** or **early** entries, **lost receipts, overdue** or **prepaid** accounts and **unpaid cheques.**
- Allows **several bank accounts at once,** and transfers between them.
- Lets you **correct mistakes** as they happen or later when they show up.
- **Search, replace, overwrite, delete, transfer, redate** any transaction.
- **Very fast – no disk drive required. Full printouts** on **any printer.**
- Full **step-by-step instructions** and sample accounts supplied.

. . . The 16K ROM gives professional results for only £49.95
Derbyshire Software, 70 Lees Hall Avenue, Sheffield, S8 9JF
Phone (0742) 557229. FREE FREE Printer Utility on disc

FAMILY HISTORY SYSTEM
Health Warning: Genealogy is Addictive
PAYROLL (Wages)
ACCOUNT-PLUS
Demonstration Discs £2.50 each
Prices: £20.52, £57.44 & £57.44 inc VAT
Micro Trader £230

Micro Aid
25 Fore St., Praze, Camborne, Cornwall TR14 0JX
Telephone: 0209-831274 and ask for Colin
Compact
Archimedes

ATTENTION ARCHIMEDES USERS!

ARVIS Video Graphics Podule

This remarkable system upgrades the standard Archimedes computer and colour monitor to provide fully genlocked live colour video displays.

The built in, real-time frame grabber with 380K bytes of video memory allows the simultaneous display of 32 thousand different colours to create video quality images and modified images in colour, monochrome mode 15 and false colours.

A large range of software controlled keys and effects are provided to combine the images from the live video source, the video frame store display and the normal Archimedes display into one video output.

Please write for details of the ARVIS system and our Beeb-Lock range for standard BBC Micros

VIDEO ELECTRONICS LIMITED
Wigan Rd., Atherton, Manchester M29 0RH
Tel: 0942-882332

MEGAPRINT-NLQ

Ideal for use in the home, schools and offices. Megaprint-NLQ is a self-contained publishing package for the BBC B/B+/Master micros with 5.25" disk drive(s) and DFS. It may be used with any Epson FX80 compatible printer and comes complete with:

- A font editor for creating and editing fonts.
- A document editor on 16K ROM to design your notices. Features include text of any height or width, proportional spacing, full justification, underline and inverse text.
- Twelve complete fonts. Each of the 95 characters in every font is designed on an incredible 48 by 48 grid.

A COMPLETE PACKAGE FOR ONLY £29.95 INC.

WHEN ORDERING PLEASE STATE DISK FORMAT REQUIRED 40 / 80 TRACK SINGLE / DOUBLE SIDED

Make cheques/P.O.s payable to Sabre Software. For further details, send a large SAE. Educational orders welcome.

SABRE SOFTWARE
Sabre Software.
23 Sispara Gdns.,
London, SW18 1LG
SABRE SOFTWARE

ADVERTISERS' INDEX

4mation ... 126
21st Software ... 88
Acorn ... 24, 25
Apex software ... 126
Atari Corp (UK) Ltd ... 16, 17
B&S Computing ... 107
Beebug ... 3, 6, 52, 74
Brad St Computers ... 126
Care Electronics ... 30
Carswell Computers ... 126
Centec ... 38
Charm Microsoft ... 137
CJE Microcomputers ... 8
Clares ... 60
Computaccount ... 70
Computech ... 111
Computeck ... 72
Computer Concepts ... 10
Computer Repairs ... 124
Dabs Press ... 122
Datastore ... 137
Delta Computers ... 29
Derbyshire Software ... 138
Electro Music Research ... 29
Field Electric Ltd ... 126
G2 Systems ... 72
Integrex ... 115
Impact Posters ... 15, 139
Ixchel Software ... 137
Kosmos ... 137
Maths Workshop ... 30
Mayhew Telonics ... 137
Meadow Computers ... 123
Meedmore Distribution ... 78
Melton Computer Supplies ... 50
Micro Aid ... 138
Microboss ... 126
Microhelp ... 81
Microman Computers ... 56
Micromedia ... 123
Microsol ... 81
Mijas software ... 137
Minerva Systems ... 40, 44
Morley Electronics ... 36
Nebulae ... 126
Paul Fray ... 122
PMS Communications ... 120
Sabre software ... 138
Selec Software ... 72
Silicon Vision ... 76
Software Bargains ... 49
Solidisk Technology ... 110
Star Micronics ... 34
Superior Software ... 2, 59, 140
System Applied Technology ... 123
Technomatic ... 80
Ted Kirk ... 138
Topologika ... 138
Towerhill ... 12
Twillstar Computers ... 116
Video Electronics ... 138
Viglen ... 43
Vine Micros ... 50
Voltmace ... 14
Watford Electronics ... 92-106
Weserve ... 120
Willow Software ... 29
WL Computers ... 124

WANTED – *DOOM* SURVIVORS

Remember your first adventure game? Rushing home, you watched the cassette slowly unwind its mystery into your computer: the beginnings of an addiction you've lived with ever since.

Maybe that game was *'Countdown to Doom"* by Peter Killworth. Well, Peter has come up with another *best-seller.*

'Return to Doom' is Part 2 of Peter's Doom Trilogy. Will you return to that inhospitable planet to rescue the Ambassador of Regina? You know the scenario – well, some of it – but the puzzles are, *quite simply, Peter at his best.*

BBC/Master/+3/PCW/CPC/PC Versions all £12.95 inc. VAT and P&P from:

SPECIAL CHRISTMAS OFFER ...
TOPOLOGIKA
... RETURN THIS ADVERT FOR £1 OFF

FREEPOST, PO Box 39, Stilton, Peterborough PE7 3BR
Tel: 0733 244682 (24 hours)

LEARNING MUSIC?
YOU NEED MY SOFTWARE

These programs give you the chance to practise your Theory and general musicianship as regularly as you practise on your instrument – and you'll enjoy it too. Great value for money. Write or 'phone for full details.

THEORY OF MUSIC Questions and Exercises – Grades 2 to 5 ... ... £12.80
PLAY WHAT I PLAY – an aural game (beginner to advanced) £8.90
CAN YOU READ MUSIC? (beginners' quiz on notes and rests) £7.90
PLAY WHAT I PLAY and **CAN YOU READ MUSIC?** on one disk £12.80

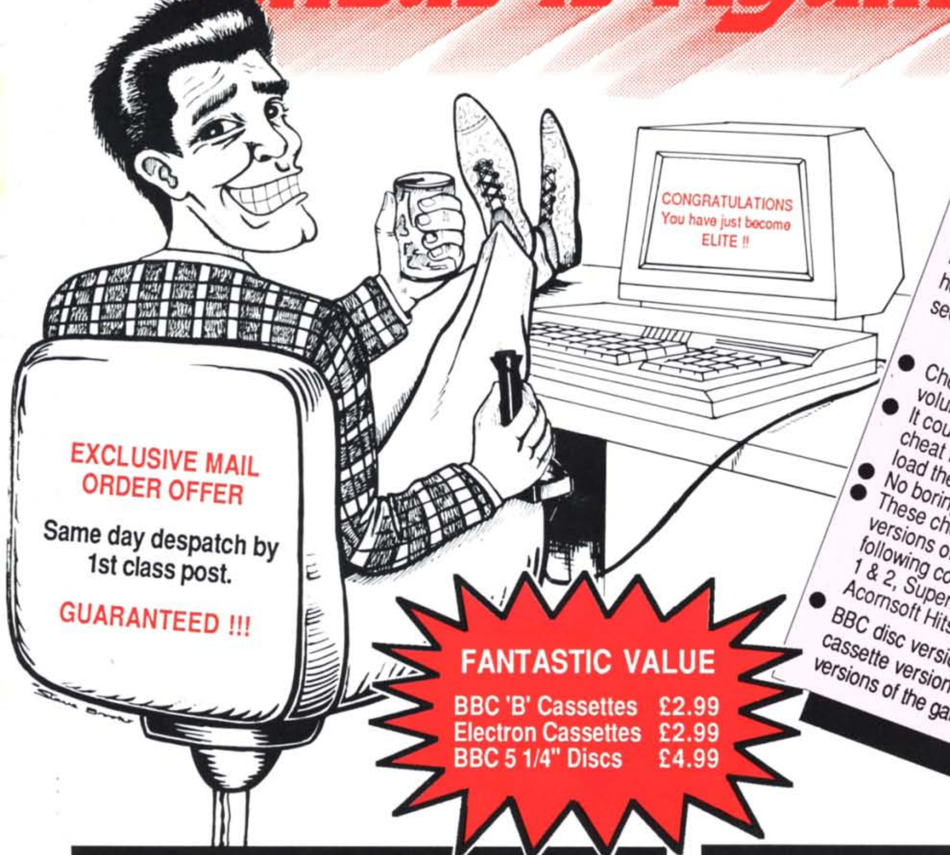
For 3.5 inch disk please add £1 (also for 40tr. single sided if ordering THEORY OF MUSIC)

Schools – add £5 for ECONET/site licence (covers all purchases)

When ordering PLEASE SPECIFY B/M/C, 80/40, DS/SS, DFS.ADFS, colour/mono

Orders and enquiries (leaflet free) To TED KIRK (MU)
33 Humber Crescent, ST. HELENS, Merseyside WA9 4HD (0744 818761)

Cheat it Again, Joe



**NEW
& totally
UNIQUE**

IMPACT TIMES

Joe is a keen games player but tends to get a bit stuck. Since using these easy to use cheats he has now got much further with his games and seen features he never even dreamed about.

- Cheats for 20 great games on each volume.
- It couldn't be easier to use - simply load the cheat from cassette or disc before you load the game.
- No boring typing involved.
- These cheats work not only on the original versions of the games but also with the following compilations: Play It Again Sam 1 & 2, Superior Collections 1,2 & 3 and Acornsoft Hits 1 & 2.
- BBC disc versions include cheats for BBC 'B' cassette versions and BBC 'B' / Master disc versions of the games.

EXCLUSIVE MAIL ORDER OFFER

Same day despatch by 1st class post.

GUARANTEED !!!

FANTASTIC VALUE

BBC 'B' Cassettes	£2.99
Electron Cassettes	£2.99
BBC 5 1/4" Discs	£4.99

CHEAT IT AGAIN, JOE Volume 1

Here are a few samples of the cheats in this volume:-

ELITE	Start the game with all the equipment already installed in your ship including mega-lasers which will destroy almost any craft with one hit. You also get 10,000 credits to compliment your 255 missiles, energy unit, escape pod, docking computer and much more!
CITADEL	Marduk the evil dictator will have no chance as you are completaly immortal and can pass through any door without a key. The death monks become harmless and you can even speed up the game to complete it in record time.
RAVENSKULL	Start immediately on any level without completing the others . Don't worry if you have any problems as you have infinite lives to keep you in the game right through to the end.

BBC 5 1/4" DISC Only £4.99	BBC CASSETTE Only £2.99	ELECTRON CASSETTE Only £2.99
1. Elite	1. Elite	1. Elite
2. Citadel	2. Citadel	2. Citadel
3. Ravenskull	3. Ravenskull	3. Ravenskull
4. Thrust	4. Thrust	4. Thrust
5. Strykers Run	5. Repton 1	5. Repton 1
6. Repton 1	6. Repton 2	6. Repton 2
7. Repton 2	7. Star Wars	7. Star Wars
8. Star Wars	8. Quest	8. Quest
9. Quest	9. Thunderstruck 2	9. Strykers Run
10. Thunderstruck 2	10. Bonecruncher	10. Bonecruncher
11. Bonecruncher	11. Plan B	11. Plan B
12. XOR	12. Killer Gorilla	12. XOR
13. Elixir	13. Elixir	13. Elixir
14. Living Daylights	14. Living Daylights	14. Thunderstruck 2
15. Deathstar	15. Deathstar	15. Deathstar
16. Starship Command	16. Starship Command	16. Starship Command
17. Arcadians	17. Arcadians	17. Arcadians
18. Kourtyard	18. Kourtyard	18. Kourtyard
19. Despatch Rider	19. Despatch Rider	19. Despatch Rider
20. Phantom	20. Phantom	20. Phantom

CHEAT IT AGAIN, JOE Volume 2

Examples of cheats in volume 2:-

REPTON 3 REPTON AROUND THE WORLD THE LIFE OF REPTON	Why not make Repton's life a little easier. All the passwords & edit codes. See the last 3 maps on every file.You'll have infinite lives & infinitive time to complete every screen. Plus you'll be immortal to boulders, spirits and monsters
CODENAME: DROID	Our cheats will help Commander Stryker a great deal.You may move around at an amazing speed, and have infinite lives, infinite energy cells, infinite Blaster/suit energy and infinite passcards.
ICARUS	You may practice on any of the 20 levels whenever you want. Plus you'll have infinite credits and energy, and/or a fast blaster recharge.

BBC 5 1/4" DISC Only £4.99	BBC CASSETTE Only £2.99	ELECTRON CASSETTE Only £2.99
1. Repton3	1. Repton 3	1. Repton 3
2. Around The World	2. Around The World	2. Around The World
3. Life of Repton	3. Life of Repton	3. Life of Repton
4. Galaforce	4. Codename: Droid	4. Codename: Droid
5. Codename: Droid	5. Paperboy	5. Paperboy
6. Crazee Rider	6. Saigon	6. Saigon
7. Paperboy	7. Spycat	7. Spycat
8. Saigon	8. Spellbinder	8. Spellbinder
9. Spycat	9. Palace of Magic	9. Palace of Magic
10. Spellbinder	10. Plan B 2	10. Plan B 2
11. Palace of Magic	11. Combat Lynx	11. Combat Lynx
12. Icarus	12. Icarus	12. Icarus
13. Impact	13. Impact	13. Impact
14. Magic Mushrooms	14. Magic Mushrooms	14. Magic Mushrooms
15. Planetoid	15. Planetoid	15. Planetoid
16. Ransack	16. Ransack	16. Ransack
17. Imogen	17. Imogen	17. Killer Gorilla
18. Uridium	18. Uridium	18. Crazee Rider
19. Karate Combat	19. Karate Combat	19. Galaforce
20. Repton3 - Passwords + Edit codes	20. Repton 3 - Passwords + Edit codes	20. Repton 3 - Passwords + Edit codes

HOW TO ORDER

Simply fill in the coupon and send with a cheque or postal order to Impact Software.

- All 'Joes' despatched by 1st class post on same day as order (Unparalleled Service)
- Free postage and packing

IMPACT Software

Impact Software
Neepsend House
1 Percy Street
Sheffield S3 8AU
Tel. (0742) 769950

To : Impact Software, Neepsend House, 1 Percy St., Sheffield, S3 8AU.
Please send me the following:

	BBC Cassette	Electron Cassette	BBC 5 1/4" Disc	Price
Cheat it Again , Joe Vol.1	☐	☐	☐	______
Cheat it Again ,Joe Vol.2	☐	☐	☐	______

I enclose a cheque / PO (made payable to Impact Software) for £

(BLOCK CAPITALS PLEASE)

Name ______________________

Address ______________________

____

____

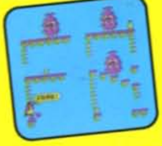
Postcode ______________________

PLAY IT AGAIN SAM 4

SUPERIOR · APPROVED ·

A Superior Hit

FRAK!
Aardvark Software
SUPERIOR SOFTWARE
ACORNSOFT



FRAK!
The Unique No. 1 Hit from Aardvark

One of the most original computer games ever devised. Propel our caveman hero Trogg about the weird world of Frak!

"Go out and see it as quickly as possible." . . . A & B Computing.
"A superb game that will take you hours to master." . . . Micro User.

Spellbinder

SPELLBINDER
Superior's Bewitching Adventure

A captivating 3D arcade-adventure full of problems to be solved by magical means.

"What is more impressive than the detailed graphics, is the sheer number of rooms comprising the two floors, three citadels, catacomb and dungeon." . . . Electron User.

NEW RELEASE

A Superior Hit

COSMIC CAMOUFLAGE
ACORNSOFT

COSMIC CAMOUFLAGE
A New Release from Superior Software

An exciting, new sequel to Meteors, with many, novel, advanced features, including increasing gravity levels. Steer your laser-ship through a hail of meteors and flying saucers, smashing them with your laser bolts. When the pace gets desperate, use your Radiation Bombs or go into Warp Drive. As a last resort, install your Camouflage Cover and become invisible to the cosmic debris.

GRAND PRIX
CONSTRUCTION SET

GRAND PRIX CONSTRUCTION SET
Superior Software's No. 1 Hit

A motor-racing game with a difference: it allows you to design your own race circuits, or to use one of the 18 pre-defined Grand Prix Race circuits. Race against another player or the computer.

"The track designing is a great idea and the racing runs very well." . . . Acorn User.

PLAY IT AGAIN SAM 4 for the BBC Micro and Acorn Electron

Superior Software has combined a brand new release, with three great chartbusters. The result is another top quality four-game compilation that combines variety with great value for money.

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	BBC Master Compact 3½" Disc	£14.95

(Compatible with the BBC B, B+ and Master Series computers)

Please make cheques payable to "Superior Software Ltd".

ACORN ELECTRON VERSION

Unfortunately it is not technically possible to produce an Acorn Electron version of GRAND PRIX CONSTRUCTION SET. The four games on the Acorn Electron version of PLAY IT AGAIN SAM 4 are: FRAK!, SPELLBINDER, COSMIC CAMOUFLAGE and GUARDIAN.

GUARDIAN — An Alligata Software Hit — received rave reviews when first released.
"It's a classic Defender game . . . and it's very good." . . . A & B Computing.
"A fast-moving space game, with striking graphics and excellent sound effects." . . . Electron User.

SUPERIOR SOFTWARE Limited

ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept 4PS5, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: (0532) 459453.

The screen pictures show the BBC Micro versions of the games.

Access VISA

24 HOUR TELEPHONE
ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.
(This does not affect your statutory rights.)